

General Description

The AGM20T09AT 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

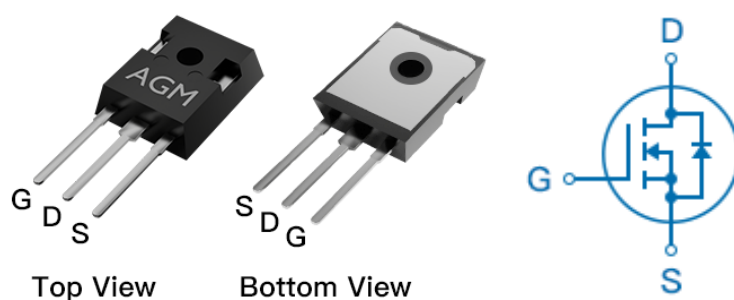
Application

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

Product Summary

BVDSS	RDSON	ID
200V	9.0mΩ	110A

TO-247 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM20T09AT	AGM20T09AT	TO-247	----	----	600

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	200	V
VGS	Gate-Source Voltage (VDS=0V)	±20	V
ID	Drain Current-Continuous(Tc=25°C) (Note 1)	110	A
	Drain Current-Continuous(Tc=100°C)	75	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	440	A
PD	Maximum Power Dissipation(Tc=25°C)	278	w
	Maximum Power Dissipation(Tc=100°C)	111	w
EAS	Avalanche energy (Note 3)	1458	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	---	62	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	0.45	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	200	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=200V,VGS=0V	--	--	1.0	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	2.0	--	4.0	V
gFS	Forward Transconductance	VDS=5V,ID=10A	--	10	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=35A	--	9.0	10.5	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=100V,VGS=0V, F=1MHZ	--	10656	--	pF
Coss	Output Capacitance		--	16	--	pF
Crss	Reverse Transfer Capacitance		--	389	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=100V, ID=55A,RGEN=4.7Ω	--	46	--	nS
tr	Turn-on Rise Time		--	24	--	nS
td(off)	Turn-Off Delay Time		--	88	--	nS
tf	Turn-Off Fall Time		--	18	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=100V, ID=55A	--	145	--	nC
Qgs	Gate-Source Charge		--	49	--	nC
Qgd	Gate-Drain Charge		--	27	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	110	A
VSD	Forward on Voltage	VGS=0V,IS=50A	--	--	1.2	V
trr	Reverse Recovery Time	IF=50A , dl/dt=100A/μs	--	185	--	ns
Qrr	Reverse Recovery Charge		--	469	--	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_J=25°C, V_{DD}=50V, V_{gs}=10V, ID=54A, L=1mH, R_G=25ohm

Typical Characteristics

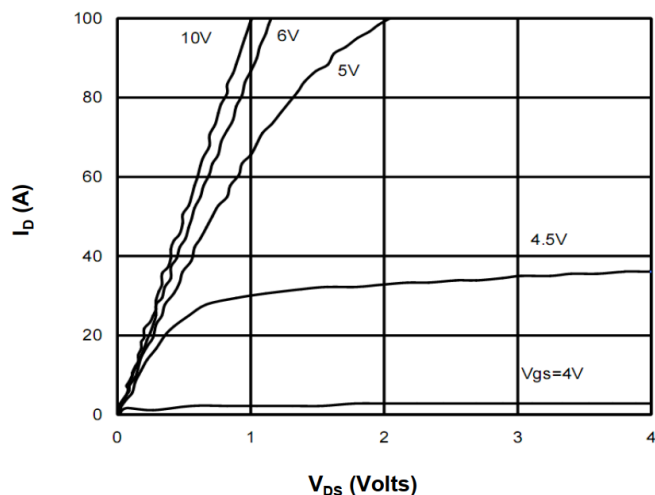


Figure 1: On-Region Characteristics

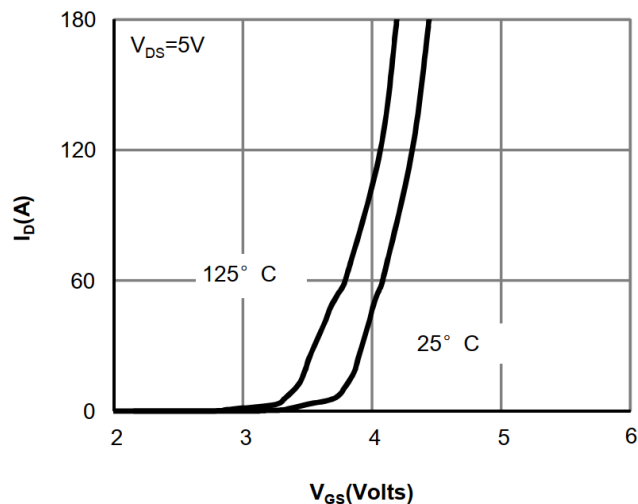


Figure 2: Transfer Characteristics

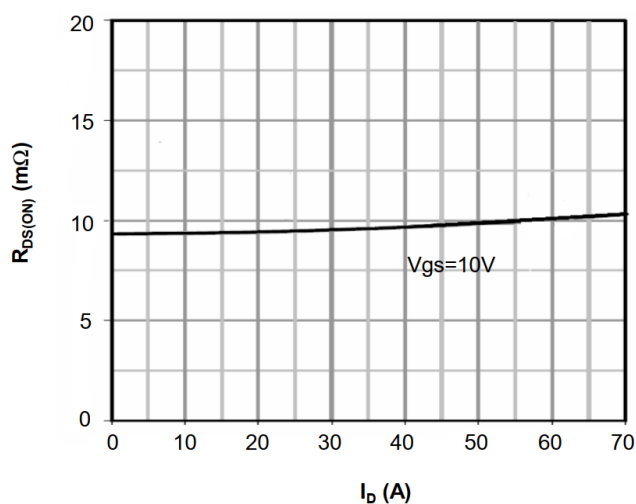


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

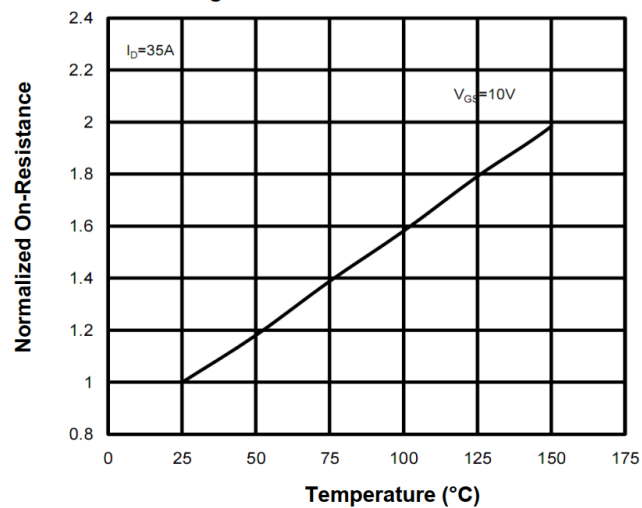


Figure 4: On-Resistance vs. Junction Temperature

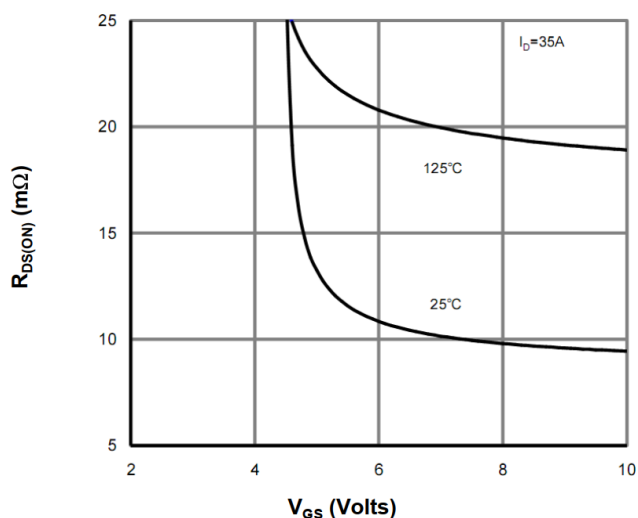


Figure 5: On-Resistance vs. Gate-Source Voltage

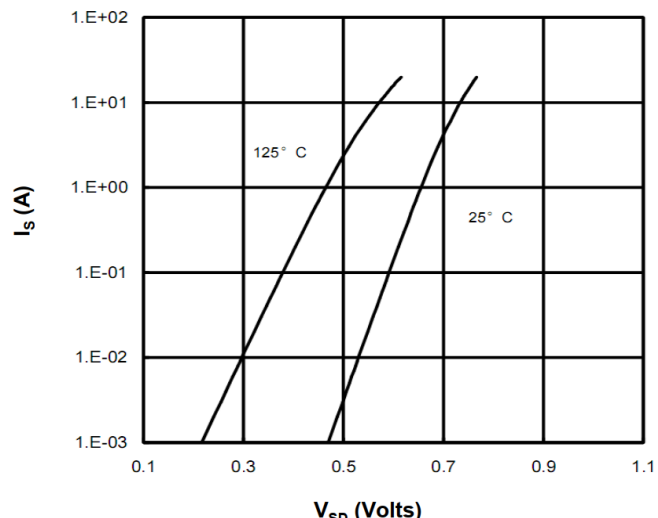


Figure 6: Body-Diode Characteristics

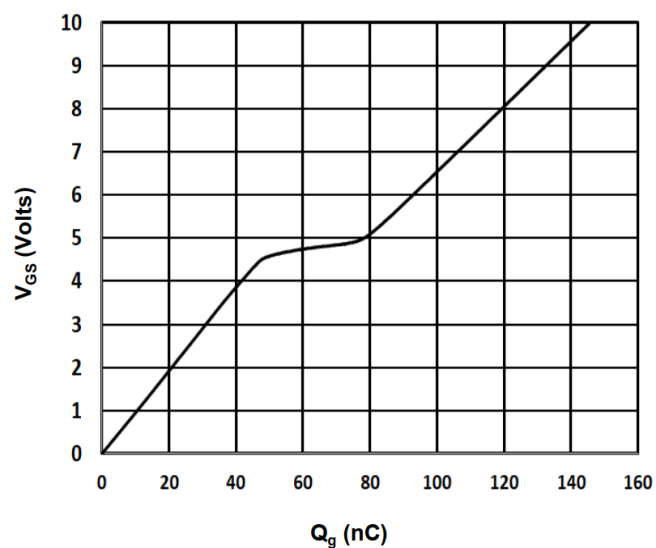


Figure 7: Gate-Charge Characteristics

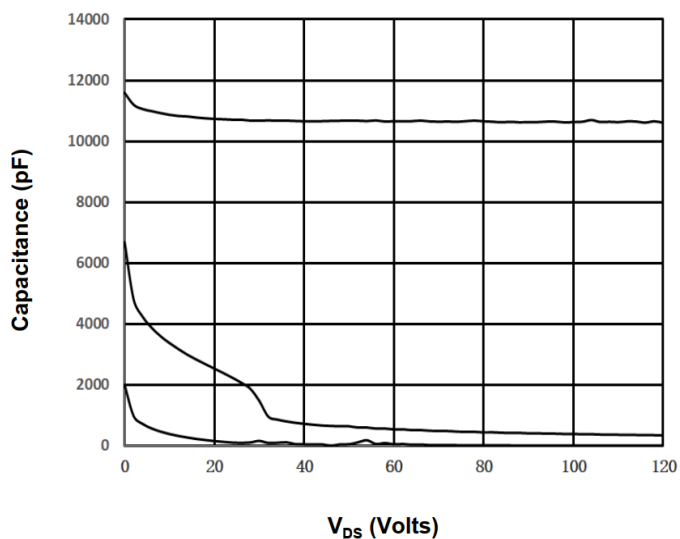
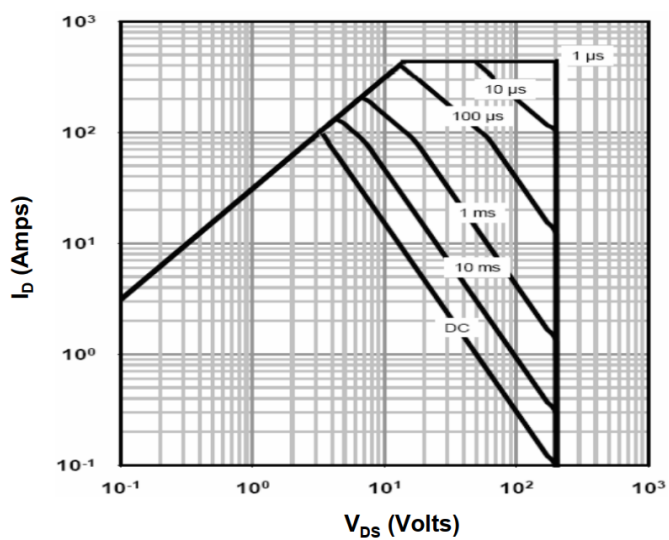


Figure 8: Capacitance Characteristics



Test Circuits and Waveforms

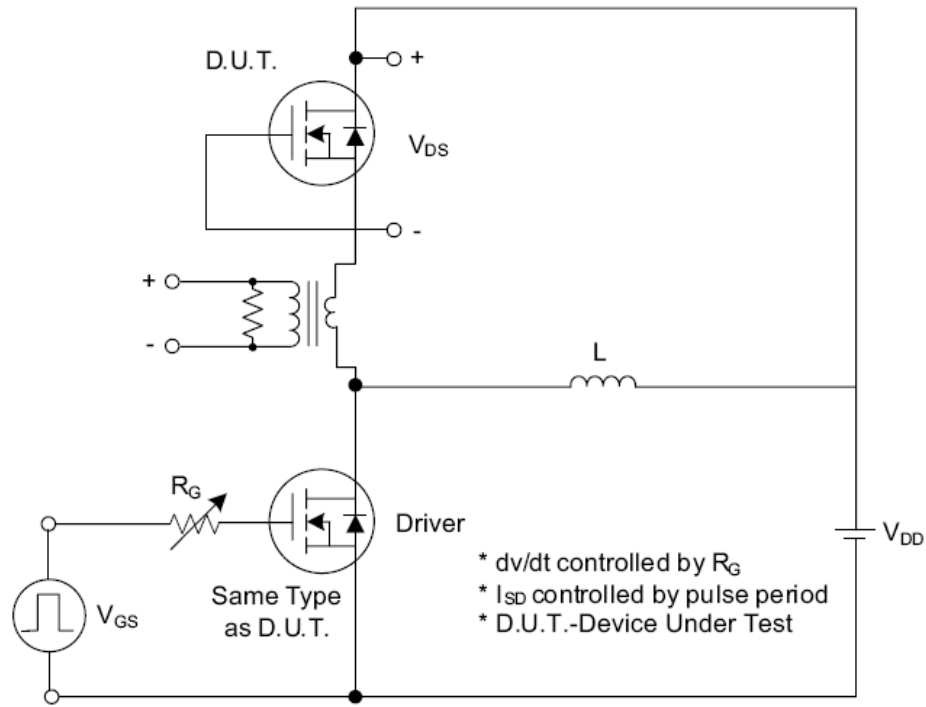


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

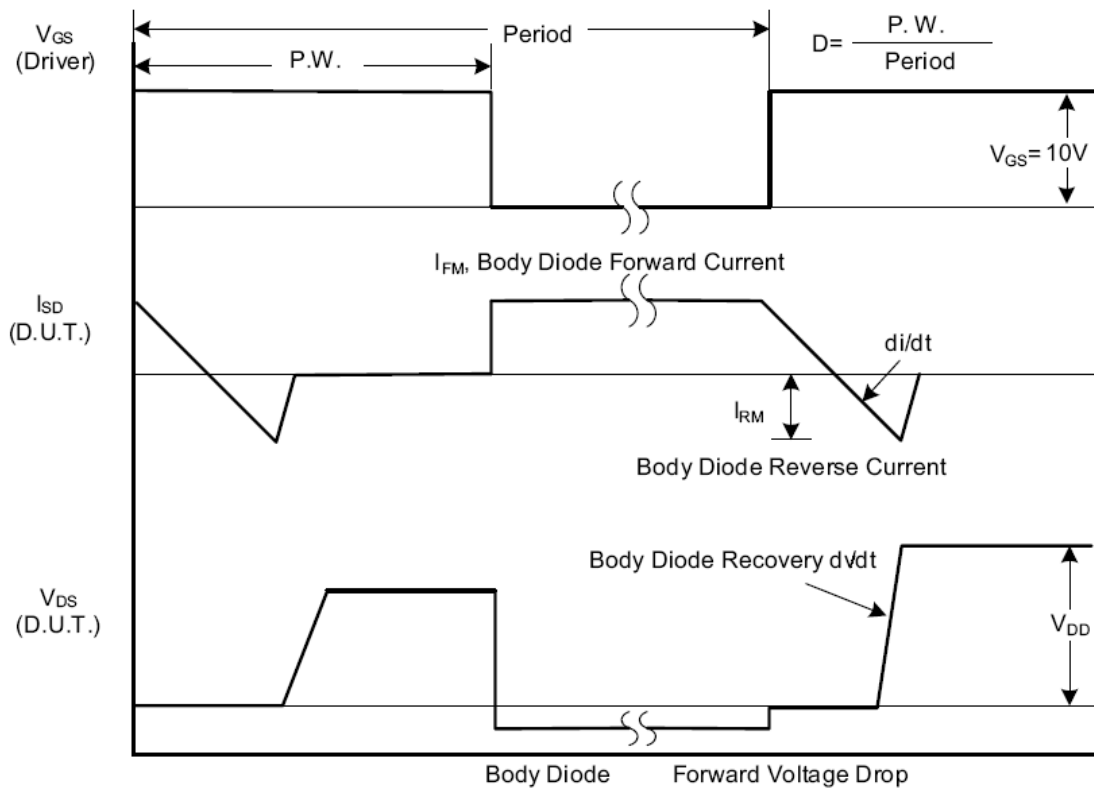


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

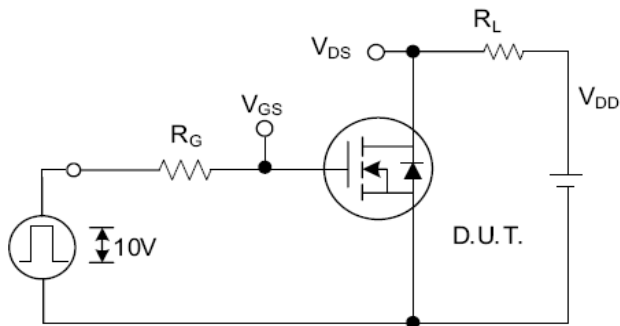


Fig. 2.1 Switching Test Circuit

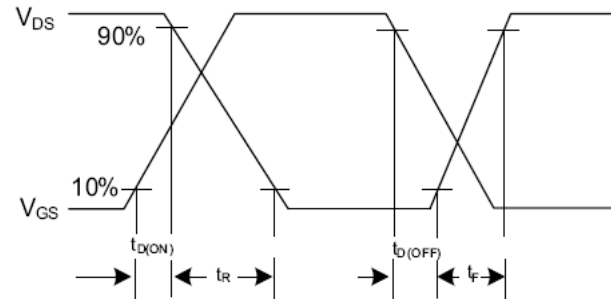


Fig. 2.2 Switching Waveforms

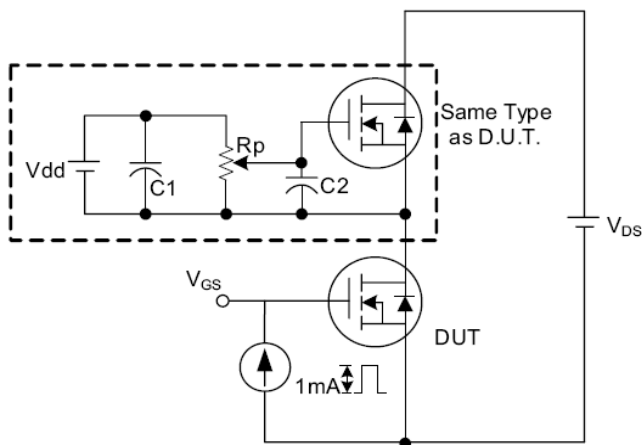


Fig. 3.1 Gate Charge Test Circuit

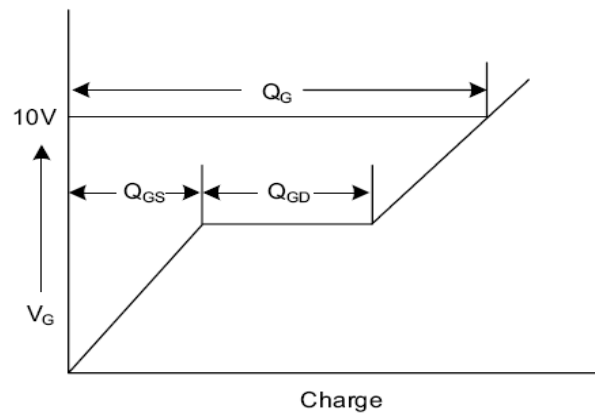


Fig. 3.2 Gate Charge Waveform

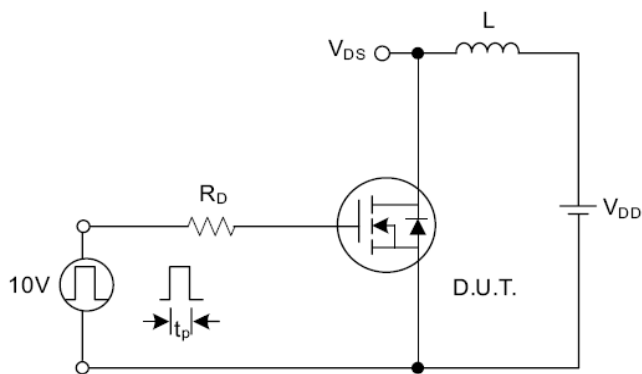


Fig. 4.1 Unclamped Inductive Switching Test Circuit

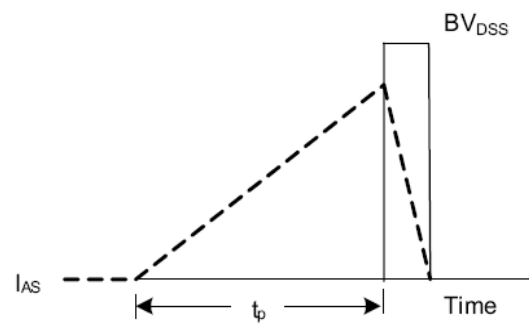
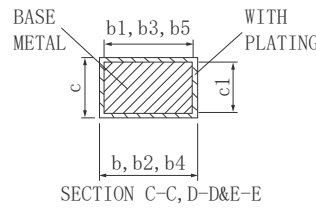
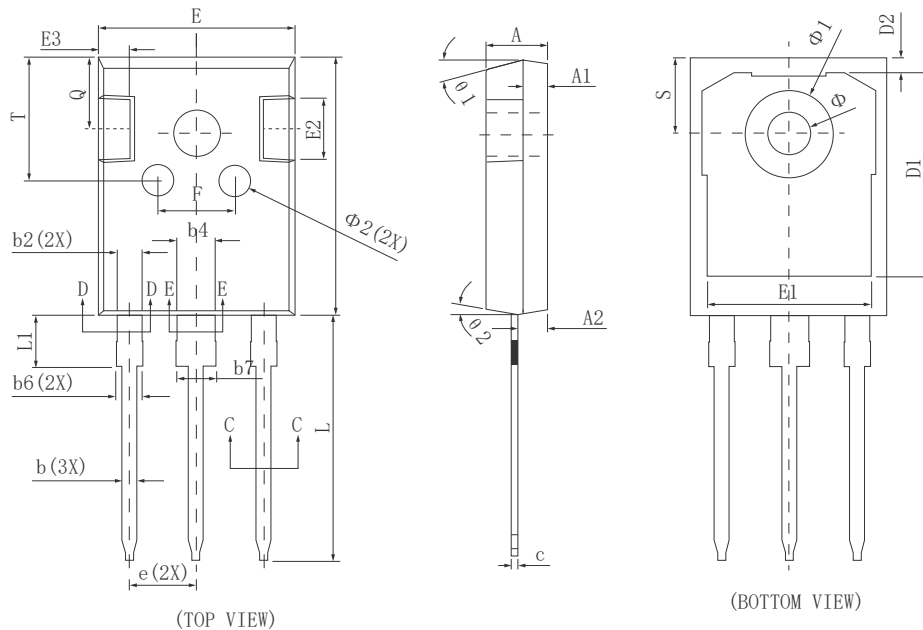


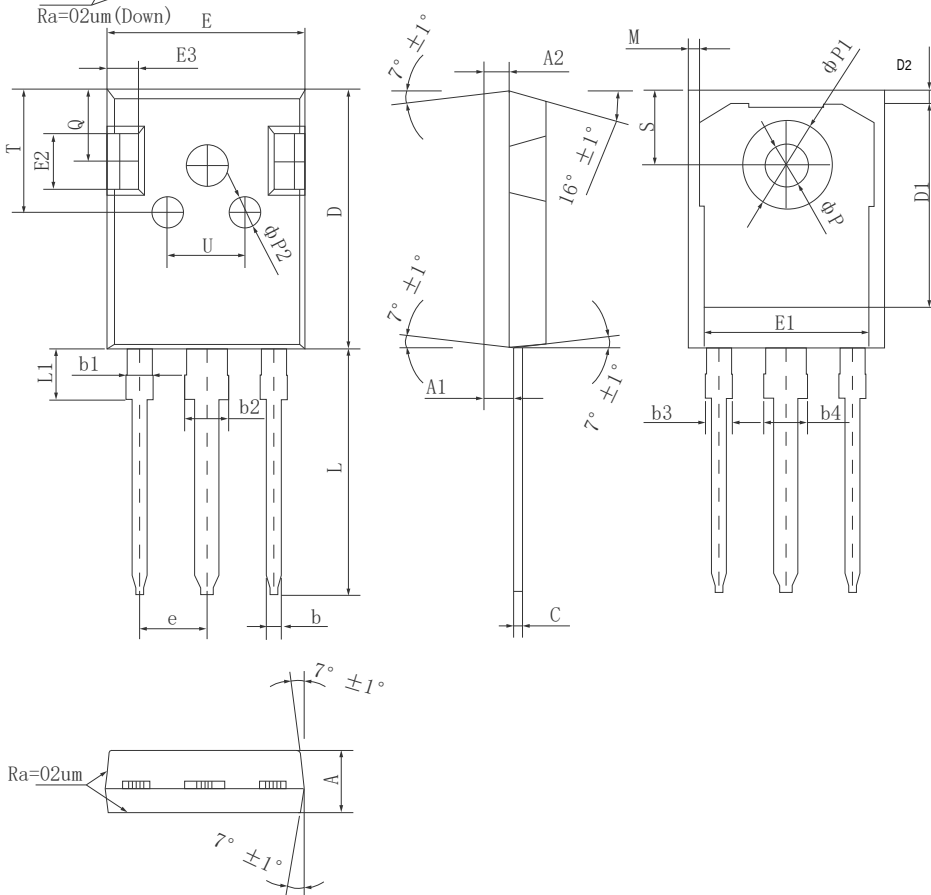
Fig. 4.2 Unclamped Inductive Switching Waveforms

Dimensions (TO-247)



Ra=0.8-1.0um (Top)

Ra=0.2um (Down)



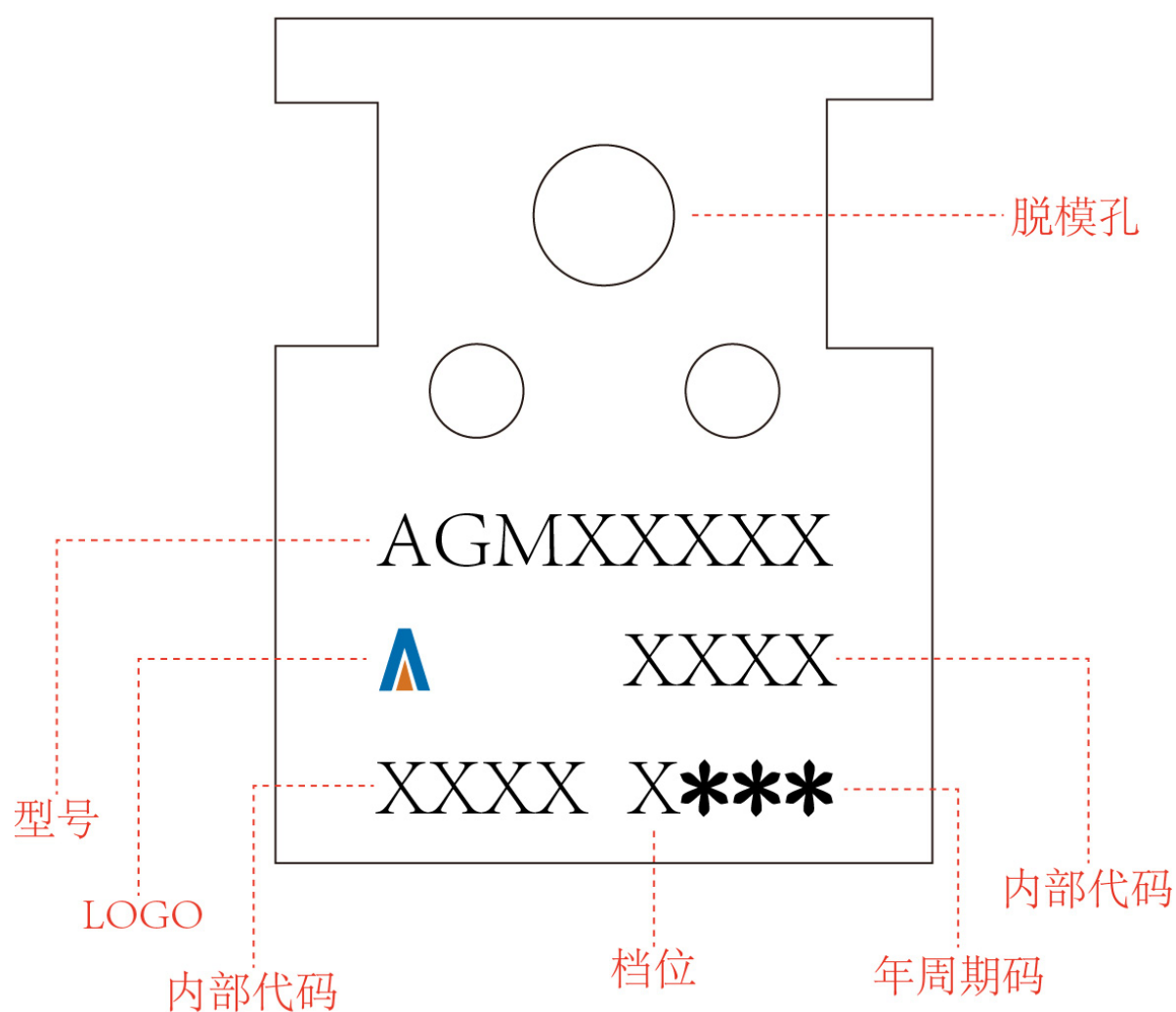
SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.900	5.000	5.100
A1	1.900	2.000	2.100
A2	2.300	2.400	2.500
b	1.160	-	1.260
b1	1.150	1.200	1.220
b2	1.960	-	2.060
b3	1.950	2.000	2.020
b4	2.960	-	3.060
b5	2.950	3.000	3.020
b6	2.000	2.100	2.250
b7	3.000	3.100	3.250
c	0.590	-	0.660
c1	0.580	0.600	0.620
D	20.900	21.000	21.100
D1	16.250	16.550	16.850
D2	1.052	1.202	1.352
E	15.700	15.800	15.900
E1	13.060	13.260	13.460
E2	4.900	5.000	5.100
E3	2.400	2.500	2.600
e	5.440 BSC		
F	6.000	6.200	6.400
L	19.750	19.950	20.150
L1	-	-	4.300
Φ	3.500	3.600	3.700
Φ1	-	-	7.400
Φ2	2.400	2.500	2.600
Q	5.600	5.800	6.000
S	6.180 BSC		
T	9.800	10.000	10.200
θ	8° REF		
θ1	15° REF		
θ2	8° REF		

DIM.	MIN.	NOM.	MAX.
A	4.90	5.00	5.10
A1	2.25	2.36	2.51
A2	1.90	2.00	2.10
b	1.16	1.20	1.26
b1	1.96	2.00	2.06
b2	2.96	3.00	3.06
b3	-	-	2.25
b4	-	-	3.25
c	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
E	15.70	15.80	15.90
E1	13.10	13.26	13.50
E2	4.40	4.50	4.60
E3	2.40	2.50	2.60
e	5.436BSC		
L	19.80	19.90	20.10
L1	-	-	4.30
M	0.35	0.89	0.95
P	3.40	3.50	3.60
P1	7.00	7.20	7.40
P2	2.40	2.50	2.60
Q	5.60	5.80	6.00
S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40

All dimensions in millimeters

TO-247

Marking Instructions:



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