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

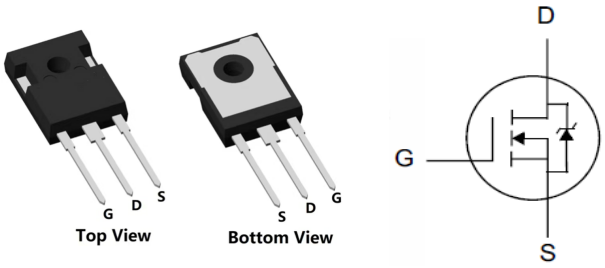
Application

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

Product Summary

BVDSS	RDSON	ID
200V	9.3mΩ	110A

TO-247 Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM20T09AT	AGM20T09AT	TO-247	----	----	450

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

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℃) **(Note 1)**	110	A
	Drain Current-Continuous(Tc=100℃)	75	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed **(Note 2)**	440	A
PD	Maximum Power Dissipation(Tc=25℃)	278	w
	Maximum Power Dissipation(Tc=100℃)	111	w
EAS	Avalanche energy **(Note 3)**	2000	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	℃

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State)[1]	---	62	℃/W
RθJC	Thermal Resistance Junction-Case[1]	---	0.45	℃/W

Table 3. Electrical Characteristics (TC=25℃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=35A	--	--	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=35A	--	9.3	10.5	mΩ
		VGS=4.5V, ID=25A	--	--	--	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=70A	--	--	1.2	V
trr	Reverse Recovery Time	IF=55A , dI/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: TJ=25℃

Typical Characteristics

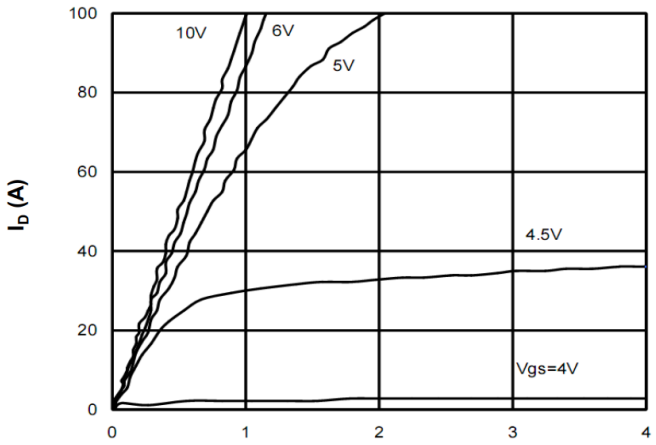


Figure 1: On-Region Characteristics

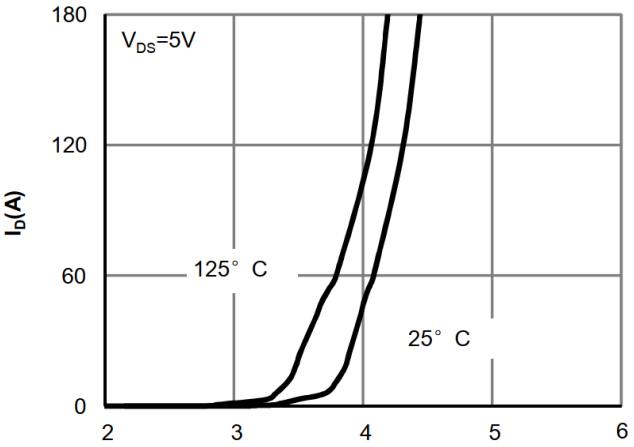


Figure 2: Transfer Characteristics

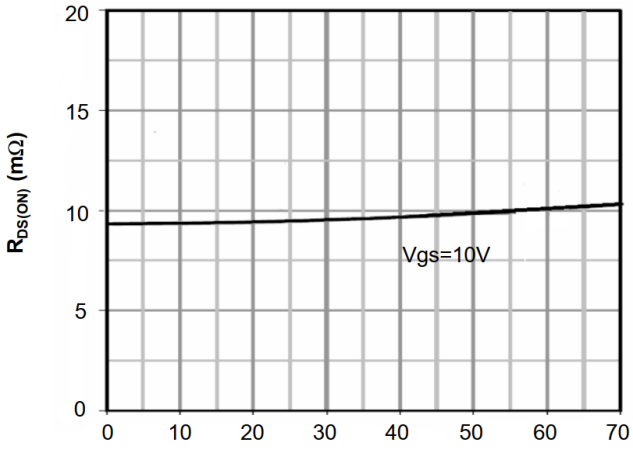


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

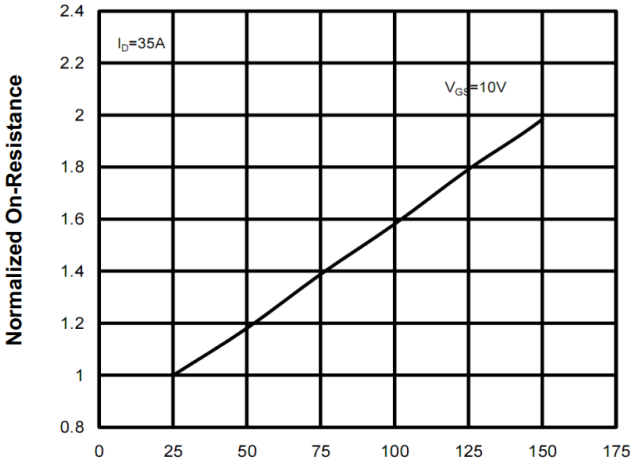


Figure 4: On-Resistance vs. Junction Temperature

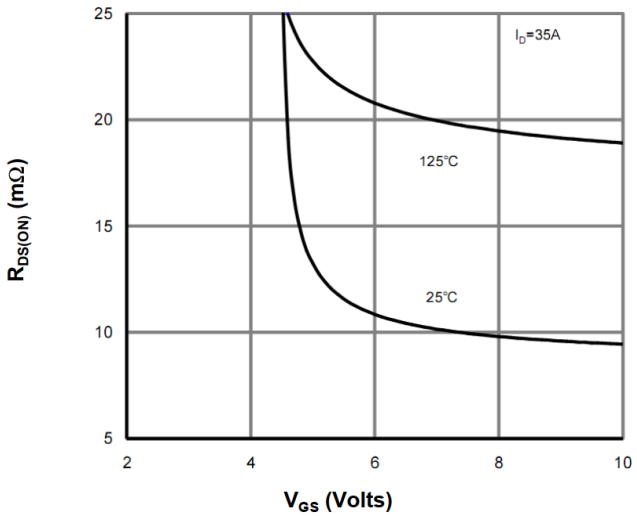


Figure 5: On-Resistance vs. Gate-Source Voltage

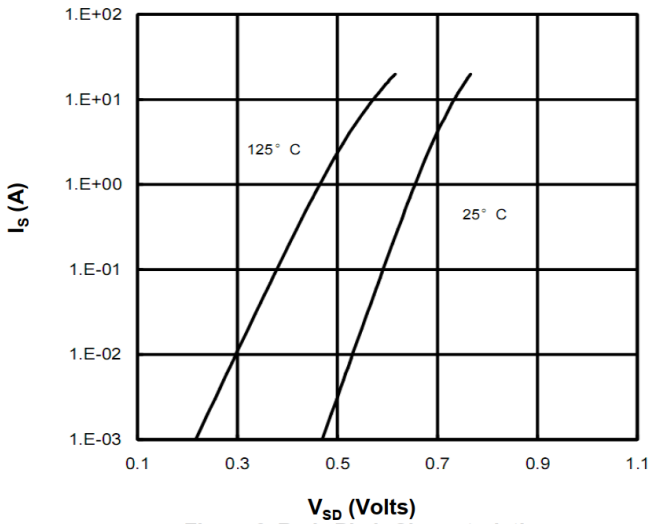


Figure 6: Body-Diode Characteristics

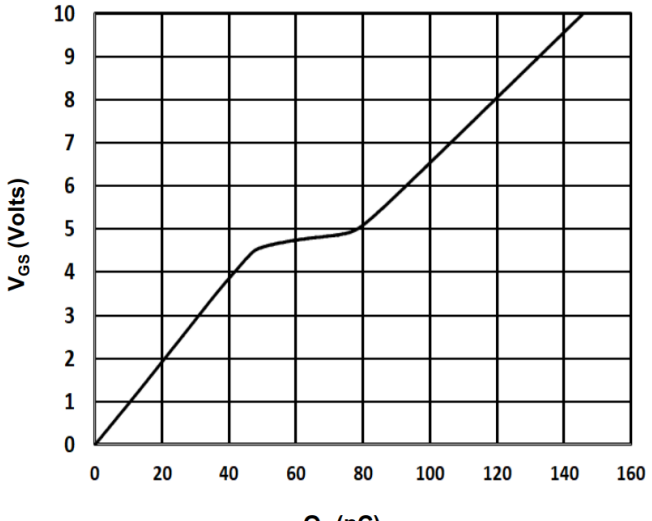


Figure 7: Gate-Charge Characteristics

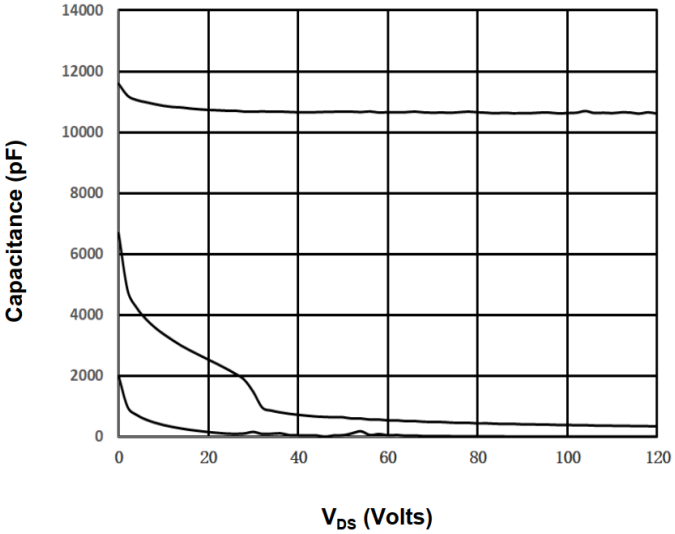
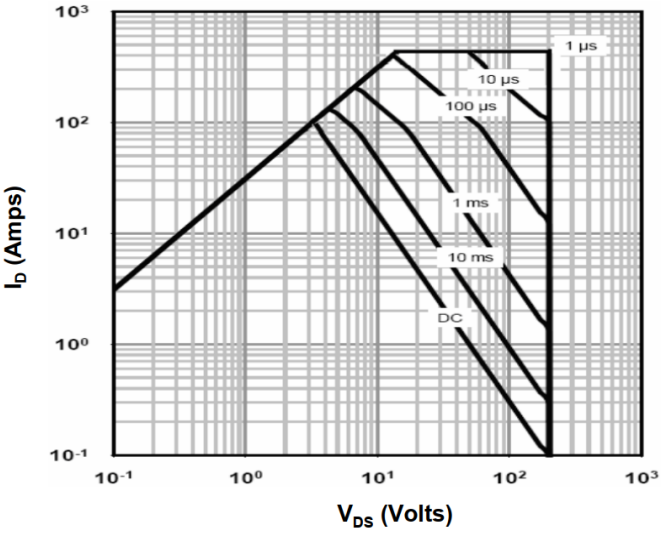


Figure 8: Capacitance Characteristics



Test Circuits and Waveforms

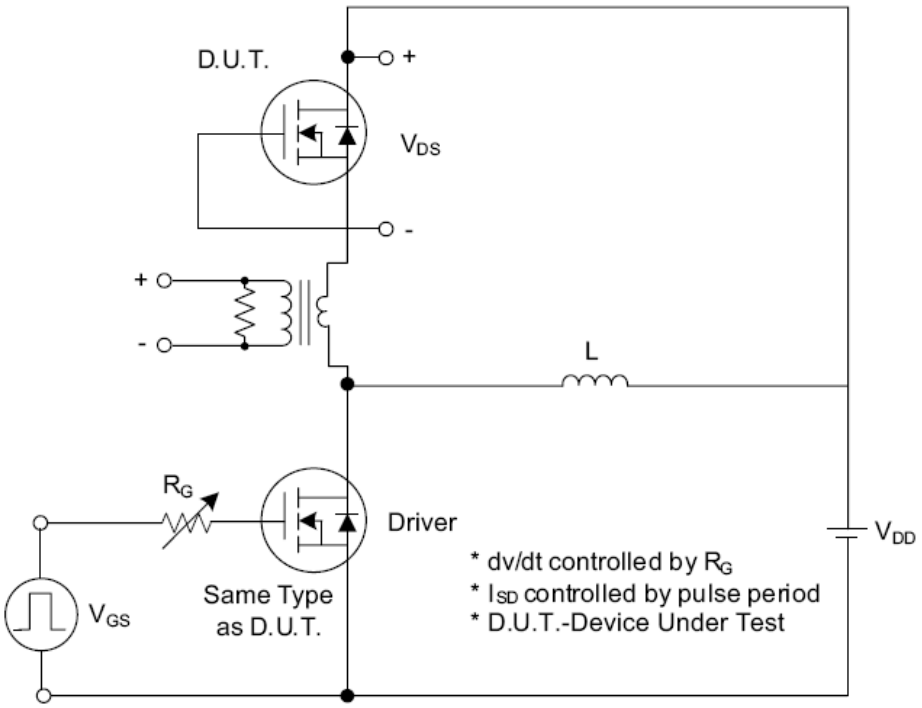


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

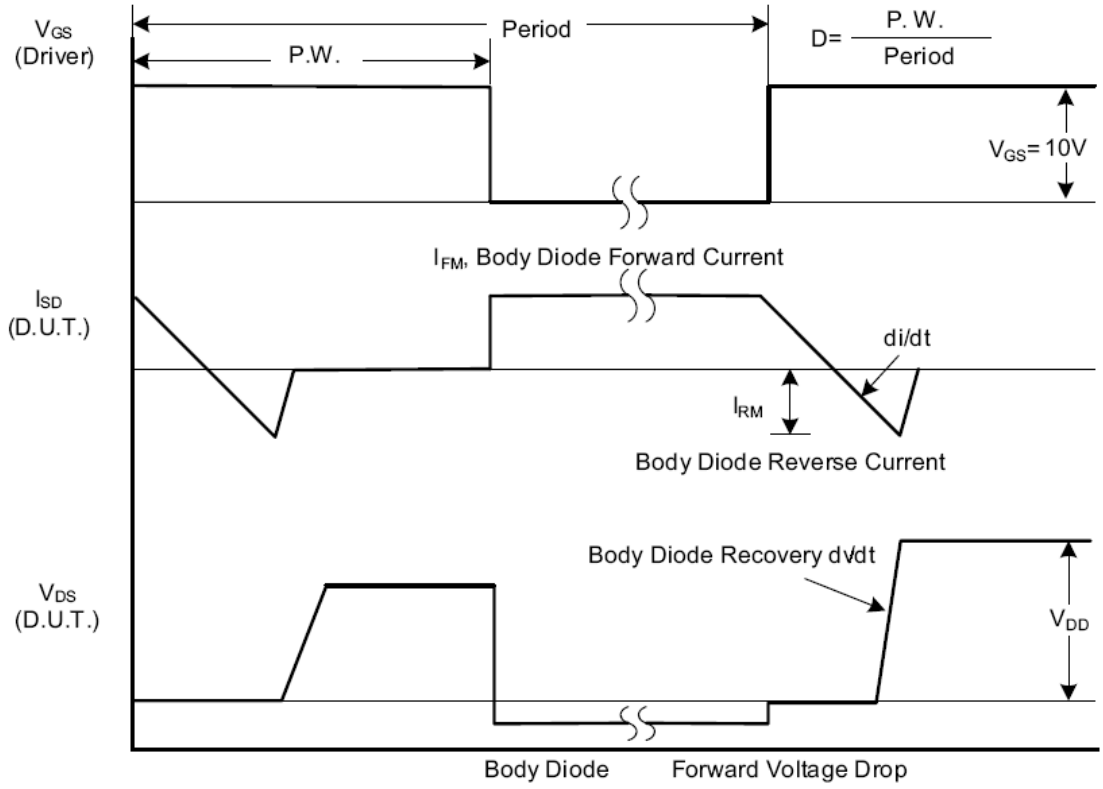


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms **(Cont.)**

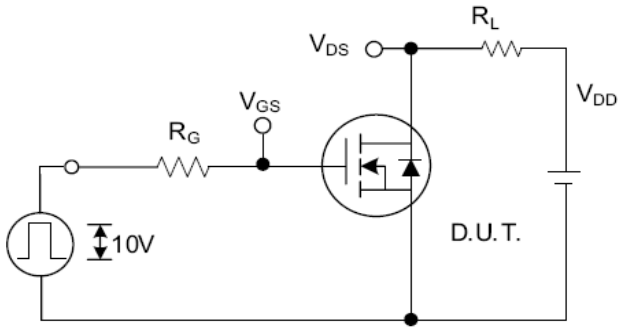


Fig. 2.1 Switching Test Circuit

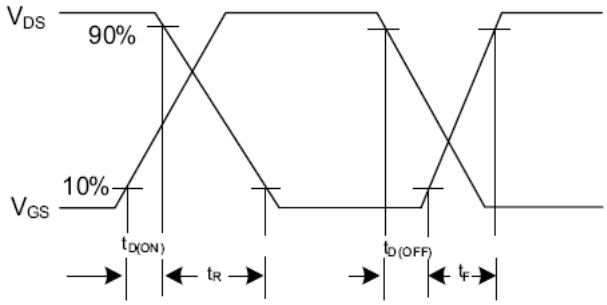


Fig. 2.2 Switching Waveforms

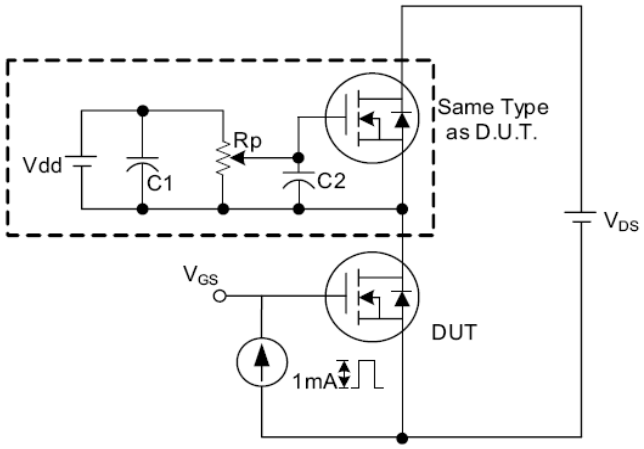


Fig. 3 . 1 Gate Charge Test Circuit

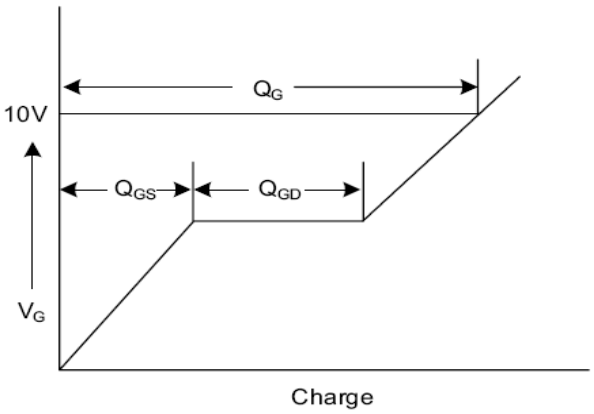


Fig. 3 . 2 Gate Charge Waveform

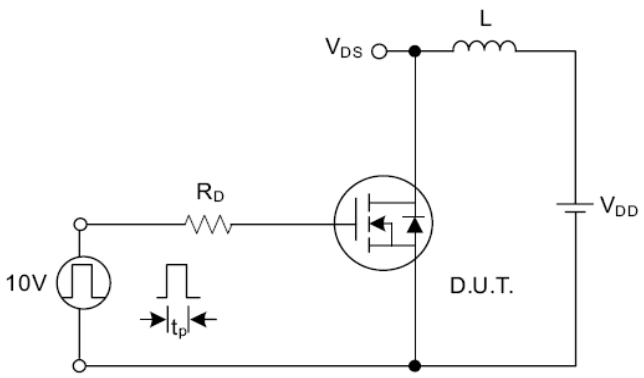


Fig. 4.1 Unclamped Inductive Switching Test Circuit

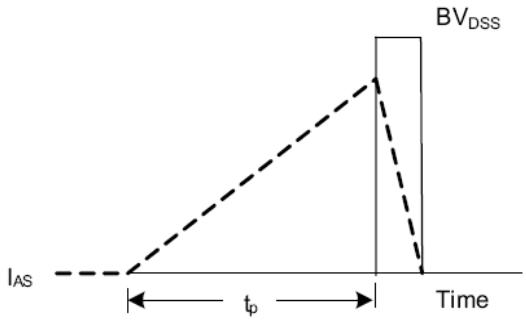
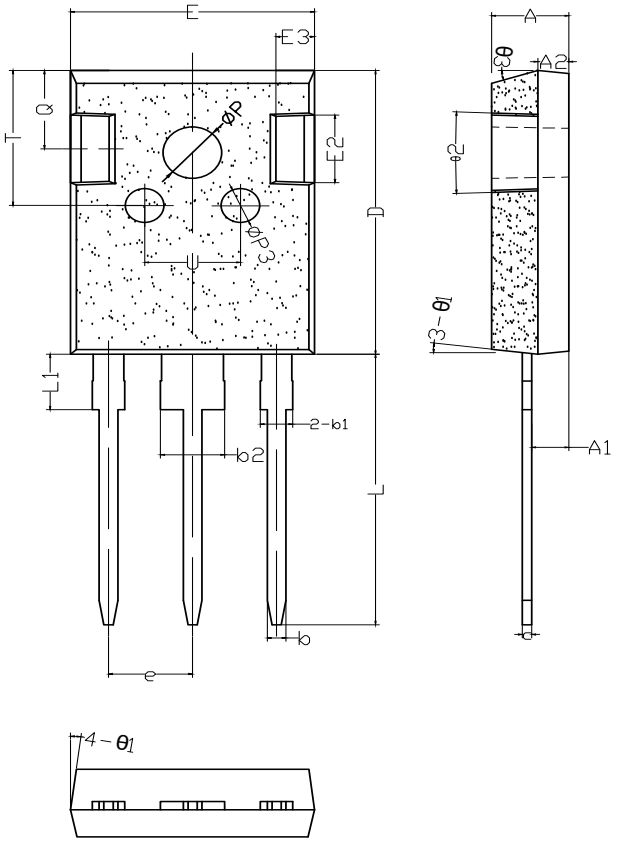


Fig. 4.2 Unclamped Inductive Switching Waveforms

TO-247 Package Information:



SYMBOL	mm		
	MIN	NOM	MAX
✻A	4.90	5.00	5.10
✻A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
✻b	1.15	1.20	1.25
✻b1	1.95	2.10	2.25
✻b2	2.95	3.10	3.25
✻c	0.55	0.60	0.65
✻D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
✻E	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
✻e	5.40	5.44	5.48
✻L	19.80	19.92	20.10
✻L1	-	-	4.30
✻ΦP	3.70	3.80	3.90
✻ΦP1	3.50	3.60	3.70
ΦP2	7.00	7.20	7.40
ΦP3	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
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°

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