

General Description

The AGM1405F combines advanced trenchMOSFET 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

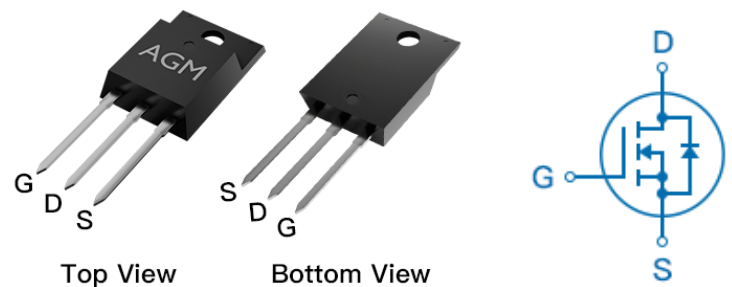
Application

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

Product Summary

BVDSS	RDSON	ID
40V	3.2mΩ	130A

TO-220F Pin Configuration



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM1405F	AGM1405F	TO-220F	---	---	1000

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)	130	A
	Drain Current-Continuous(Tc=100°C)	82	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	520	A
PD	Maximum Power Dissipation(Tc=25°C)	105	w
	Maximum Power Dissipation(Tc=100°C)	41	w
EAS	Avalanche energy (Note 3)	462	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	---	45	°C/W
RθJC	Thermal Resistance Junction-Case ¹	---	1.2	°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	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	1.3	2.2	V
gFS	Forward Transconductance	VDS=5V,ID=15A	--	33	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=30A	--	3.2	4.2	mΩ
		VGS=4.5V, ID=20A	--	4.4	6.0	mΩ
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=20V,VGS=0V ,F=1MHZ	--	2600	--	pF
Coss	Output Capacitance		--	370	--	pF
Crss	Reverse Transfer Capacitance		--	170	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	1.7	--	Ω
Switching Times						
td(on)	Turn-on Delay Time	VGS=10V,VDS=15V, RGEN=3.3Ω RL=0.75Ω	--	6.9	--	nS
tr	Turn-on Rise Time		--	1.7	--	nS
td(off)	Turn-Off Delay Time		--	30	--	nS
tf	Turn-Off Fall Time		--	15	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=20V, ID=12A	--	20	--	nC
Qgs	Gate-Source Charge		--	9	--	nC
Qgd	Gate-Drain Charge		--	11	--	nC
Source-Drain Diode Characteristics						
ISD	Source-Drain Current(Body Diode)		--	--	130	A
VSD	Forward on Voltage	VGS=0V,IS=30A	--	--	1.2	V
trr	Reverse Recovery Time	IF=30A , dI/dt=100A/μs ,TJ=25℃	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	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, VDD=25V, Vgs=10V, ID=43A, L=0.5mH, RG=25ohm

Fig.1 Power Dissipation

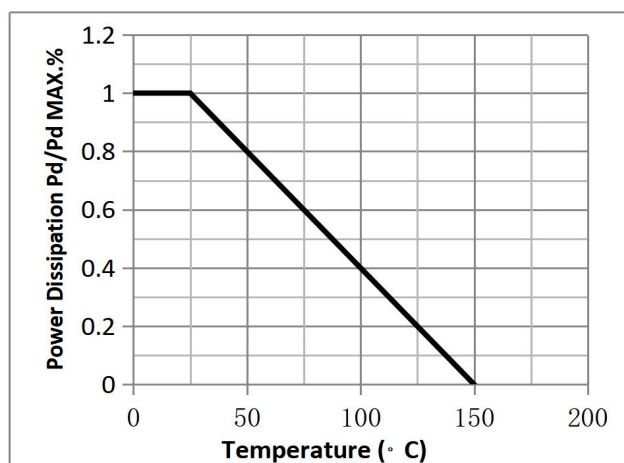


Fig.2 Typical output Characteristics

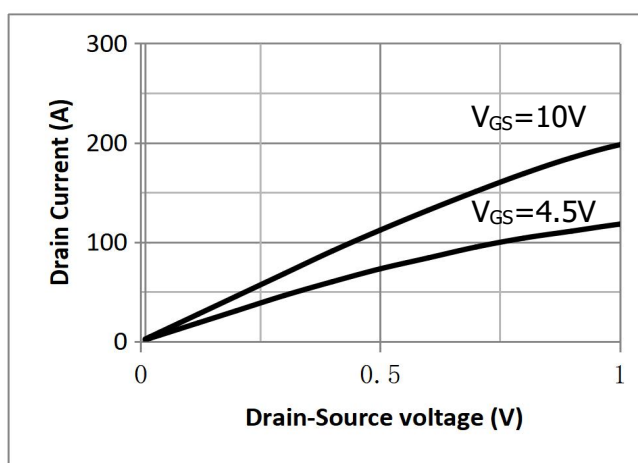


Fig.3 Threshold Voltage V.S Junction Temperature

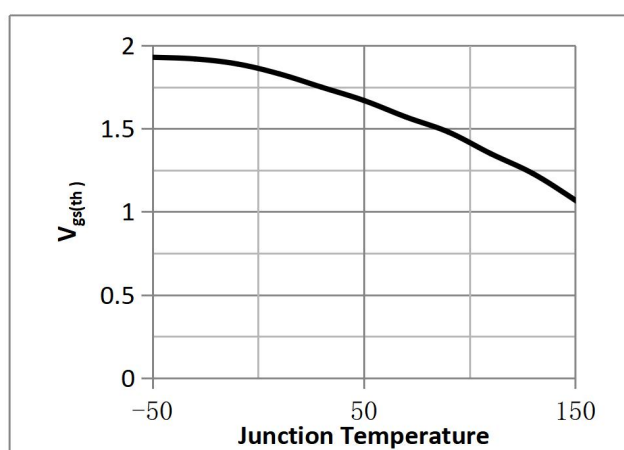


Fig.4 Resistance V.S Drain Current

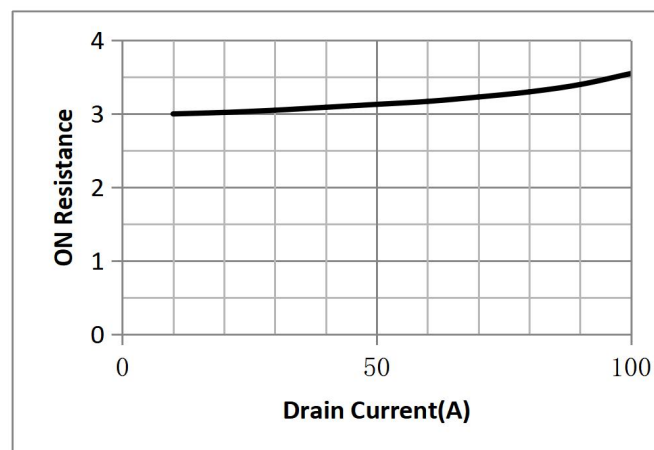


Fig.5 On-Resistance VS Gate Source Voltage

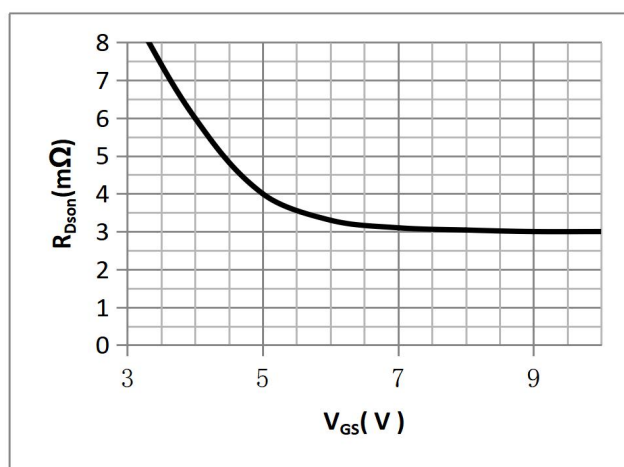


Fig.6 On-Resistance V.S Junction Temperature

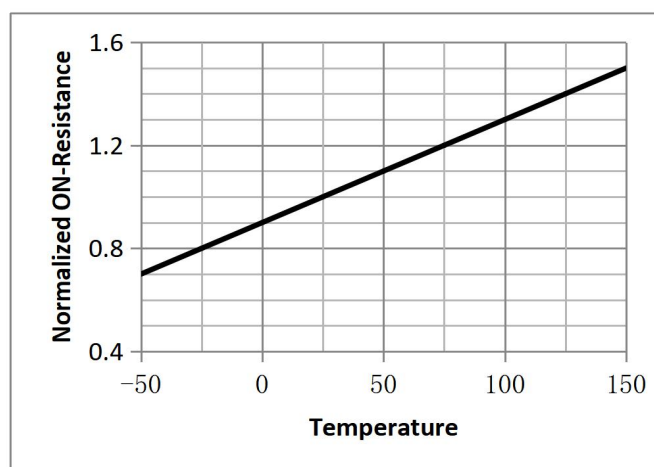


Fig.7 Switching Time Measurement Circuit

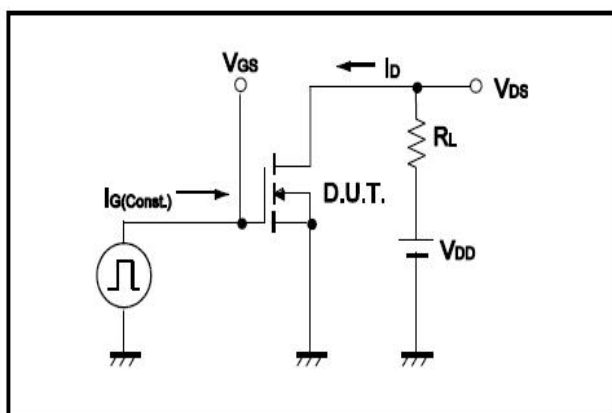


Fig.8 Gate Charge Waveform

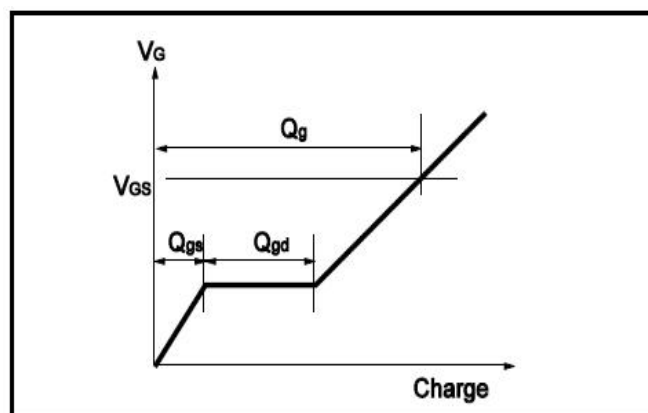


Fig.9 Switching Time Measurement Circuit

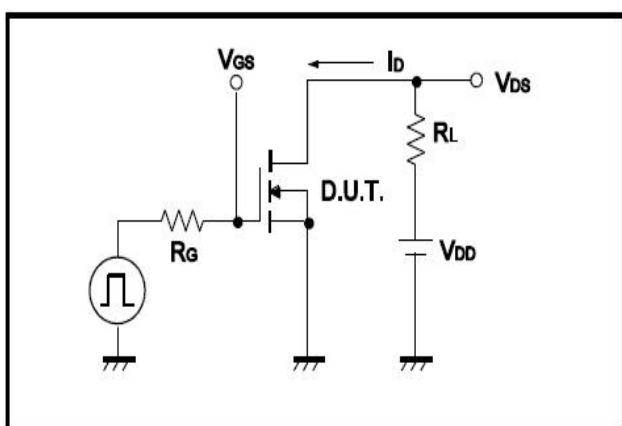


Fig.10 Gate Charge Waveform

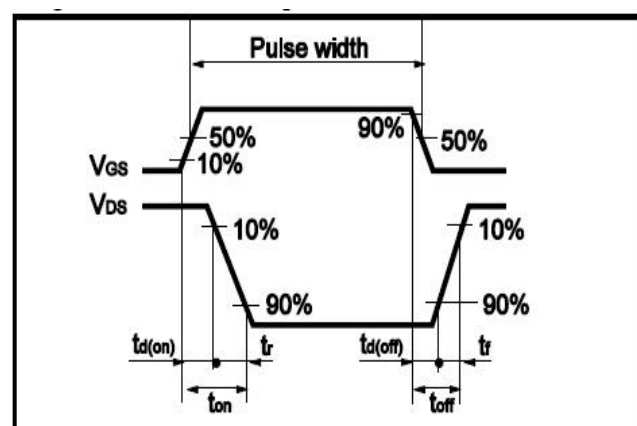


Fig.11 Avalanche Measurement Circuit

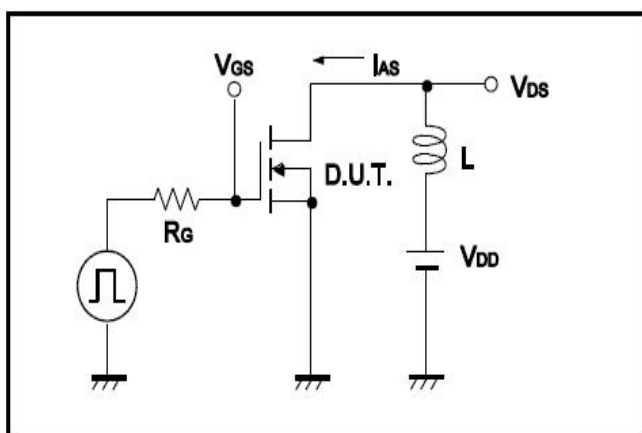
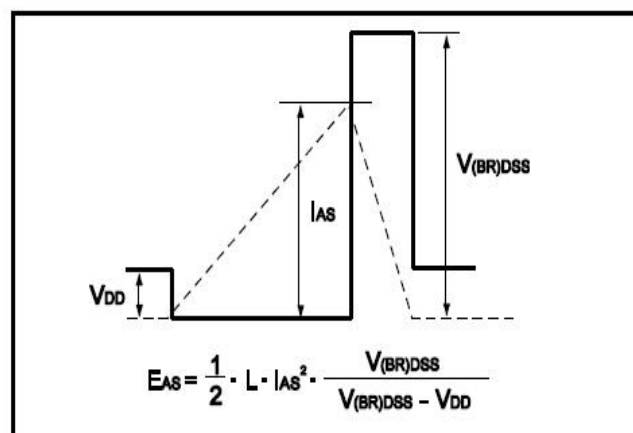


Fig.12 Avalanche Waveform



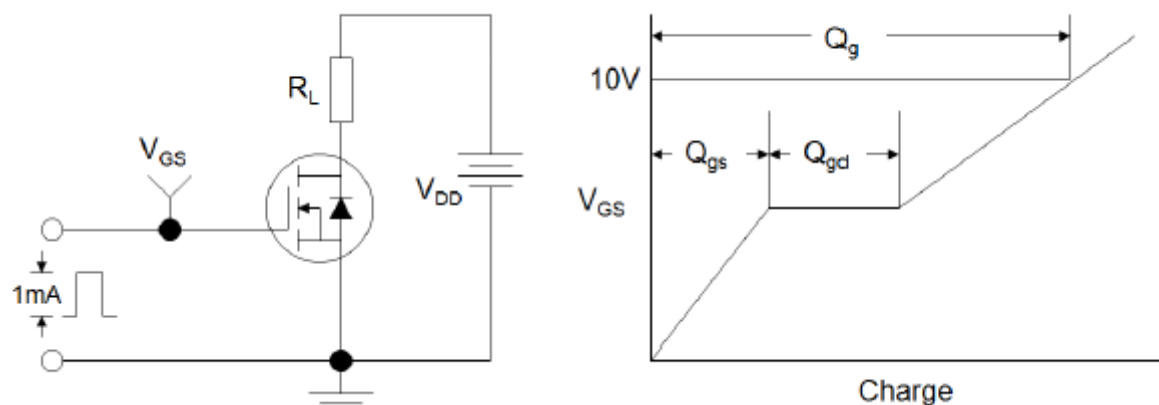


Figure1:Gate Charge Test Circuit & Waveform

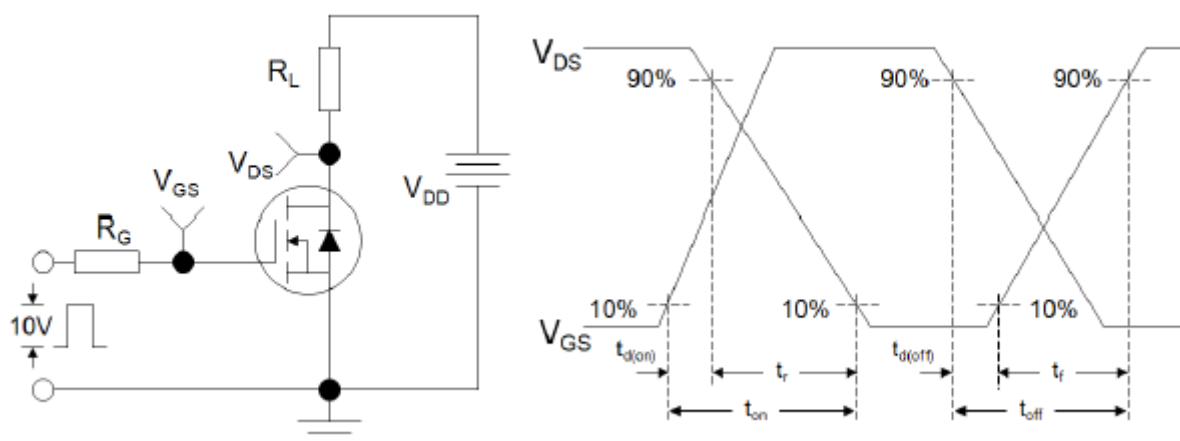


Figure 2: Resistive Switching Test Circuit & Waveforms

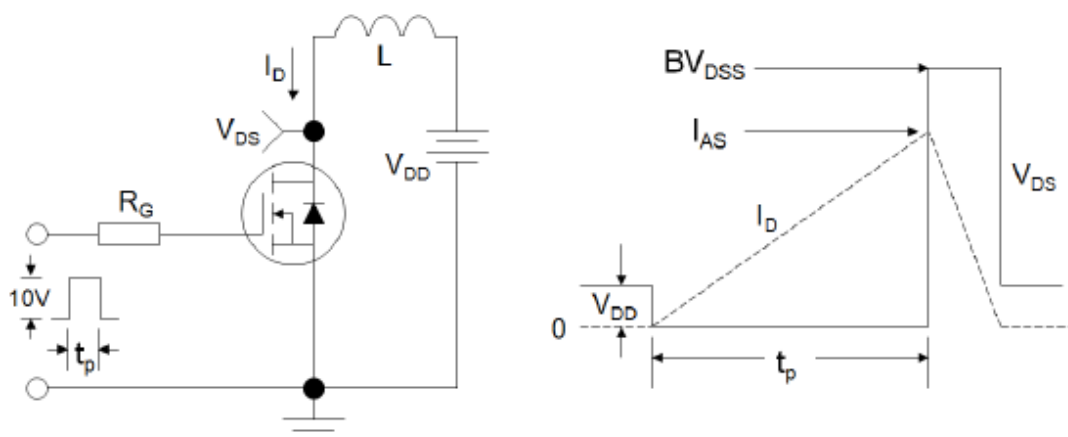
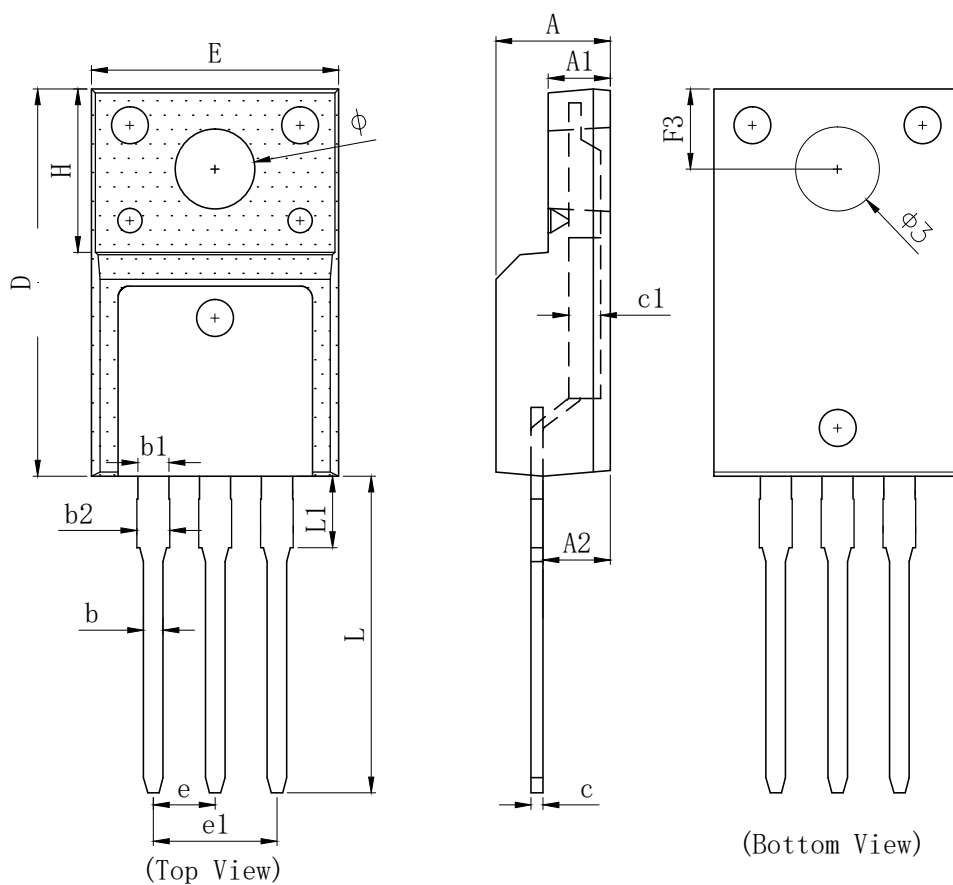


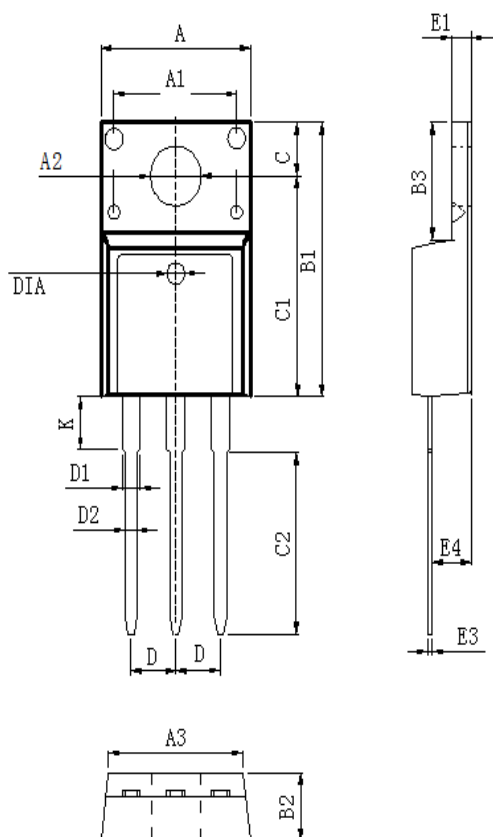
Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

TO-220F Package

Mechanical Data



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	4.500	4.700	4.900
A1	2.340	2.540	2.740
A2	2.560	2.760	2.960
b	0.700	0.800	0.950
b1	1.180	1.280	1.430
b2	1.250	1.350	1.550
c	0.400	0.500	0.650
c1	1.200	1.300	1.350
D	15.570	15.870	16.170
H	6.700 REF		
E	9.960	10.160	10.360
e	2.540 BSC		
e1	5.080 BSC		
L	12.680	12.980	13.280
L1	2.780	2.930	3.080
F3	3.150	3.300	3.450
Φ	3.030	3.180	3.450
Φ3	3.150	3.450	3.650



DIM	MILLIMETERS
A	10.16±0.3
A1	7.00±0.1
A2	3.3±0.2
A3	9.5±0.2
B1	15.87±0.3
B2	4.7±0.2
B3	6.68±0.4
C	3.3±0.2
C1	12.57±0.3
C2	10.02±0.5
D	2.54±0.05
D1	1.28±0.2
D2	0.8±0.1
K	3.1±0.3
E1	2.54±0.1
E3	0.5±0.1
E4	2.76±0.2
DIA	⊙1.5 (deep 0.2)

Unit :mm

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