HUASHUO SEMICONDUCTOR

HSU30N20

N-Ch 200V Fast Switching MOSFETs

Description

- Proprietary New Trench Technology
- RDS(ON),typ.= 43mΩ@VGS=10V
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

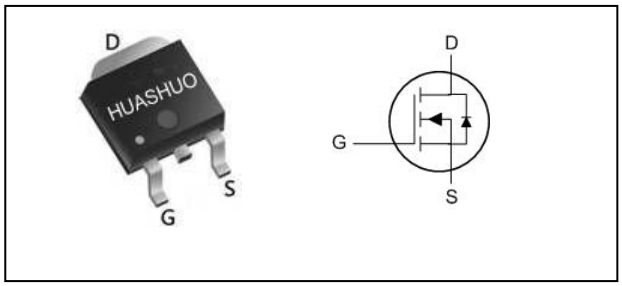
Product Summary

V_{DS}	200	V
$R_{DS(ON),max}$	48	mΩ
I_D	30	A

Applications

- Synchronous Rectification in SMPS
- Motor Control
- Hard Switching and High Speed Circuit

TO-252 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	30	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	21	A
I_{DM}	Pulsed Drain Current[2]	120	A
EAS	Single Pulse Avalanche Energy[3]	200	mJ
dv/dt	Peak Diode Recovery dv/dt	5	V/nS
P_D@T_C=25℃	Total Power Dissipation[3]	150	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.5	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	200	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	42	48	mΩ
	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A	---	48	60	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	2.3	3.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=200V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=160V , V_{GS}=0V , T_J=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ± 20V , V_{DS}=0V	---	---	± 100	nA
Q_g	Total Gate Charge	V_{DS}=100V , V_{GS}=10V , I_D=15A	---	49	---	nC
Q_{gs}	Gate-Source Charge		---	11	---	
Q_{gd}	Gate-Drain Charge		---	8	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=100V , V_{GS}=10V , R_G=10Ω I_D=15A	---	22	---	ns
T_r	Rise Time		---	5.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	75	---	
T_f	Fall Time		---	11	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	3490	---	pF
C_{oss}	Output Capacitance		---	13	---	
C_{rss}	Reverse Transfer Capacitance		---	86	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	30	A
I_{SM}	Pulsed Source Current[2,5]		---	---	120	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=15A , dI/dt=100A/μs , T_J=25℃	---	117	---	nS
Q_{rr}	Reverse Recovery Charge		---	333	---	nC

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

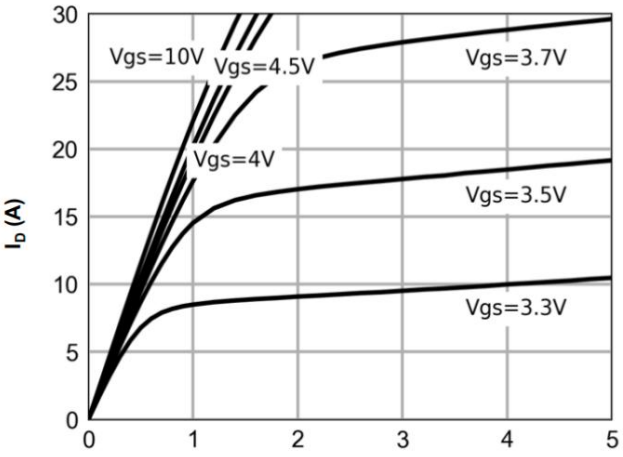


Figure 1: On-Region Characteristics

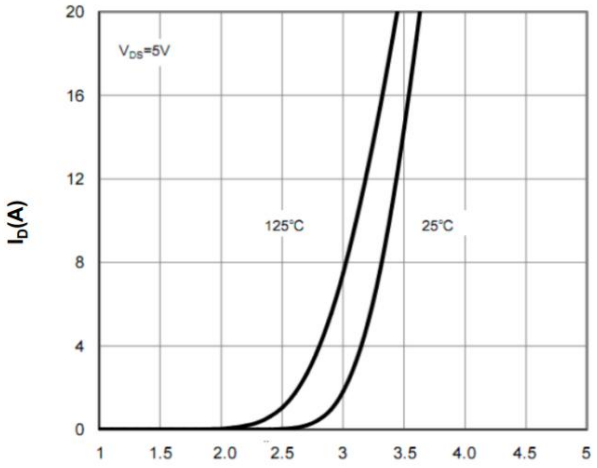


Figure 2: Transfer Characteristics

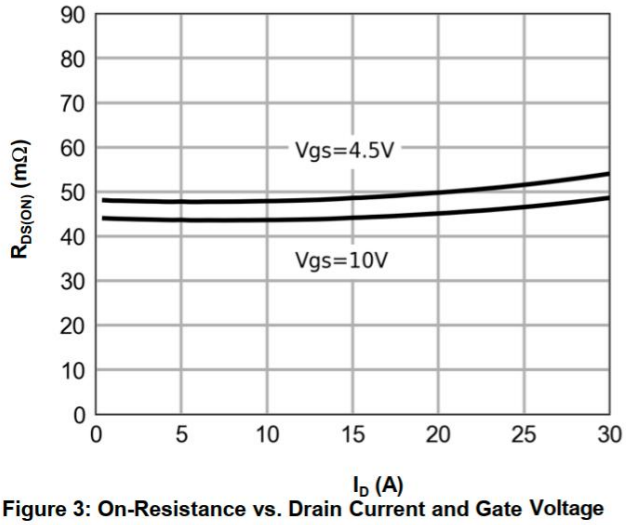


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

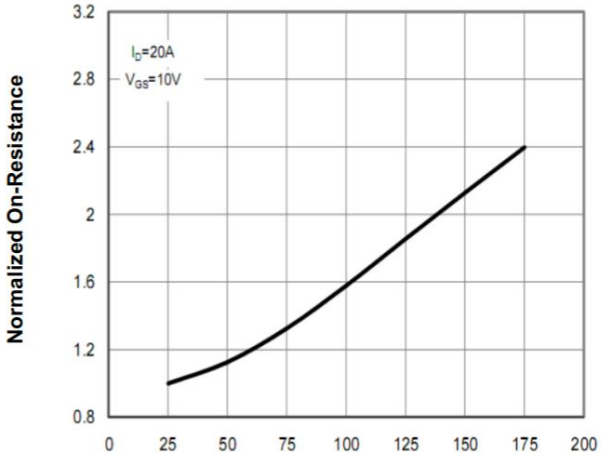


Figure 4: On-Resistance vs. Junction Temperature

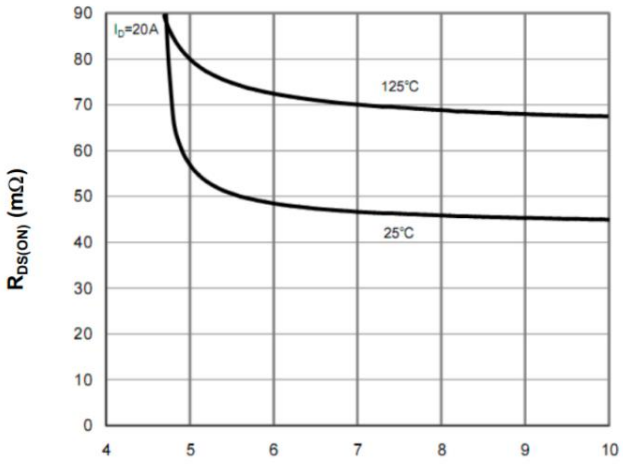


Figure 5: On-Resistance vs. Gate-Source Voltage

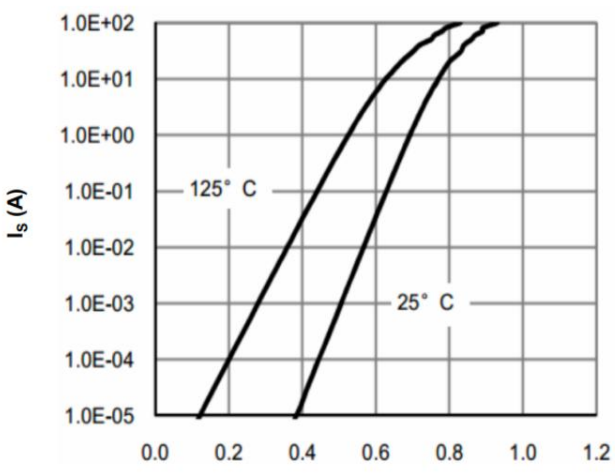


Figure 6: Body-Diode Characteristics

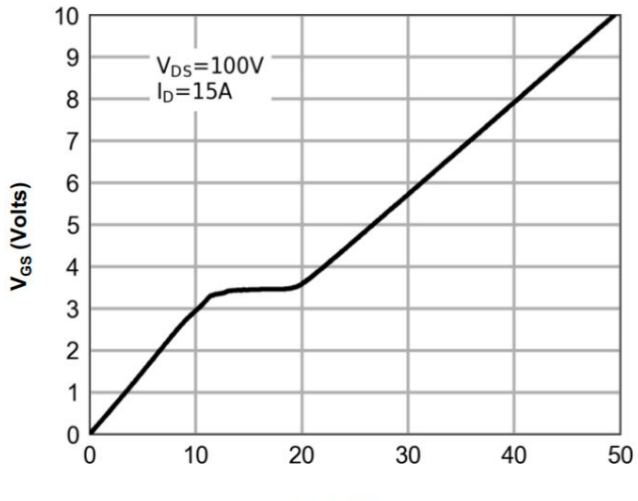


Figure 7: Gate-Charge Characteristics

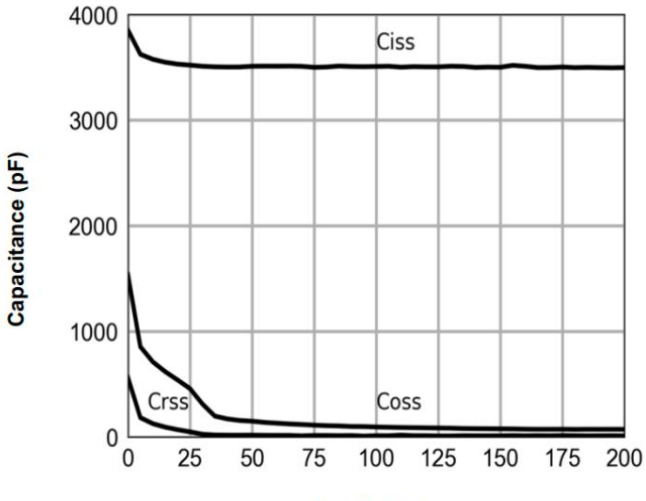


Figure 8: Capacitance Characteristics

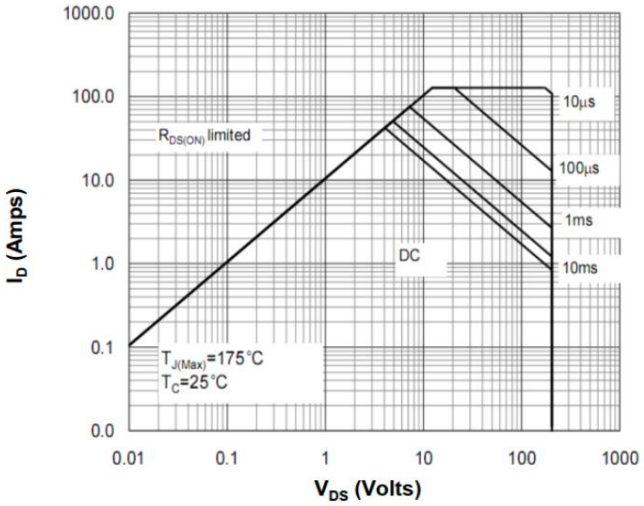


Figure 9: Maximum Forward Biased Safe Operating Area

Test Circuits and Waveforms

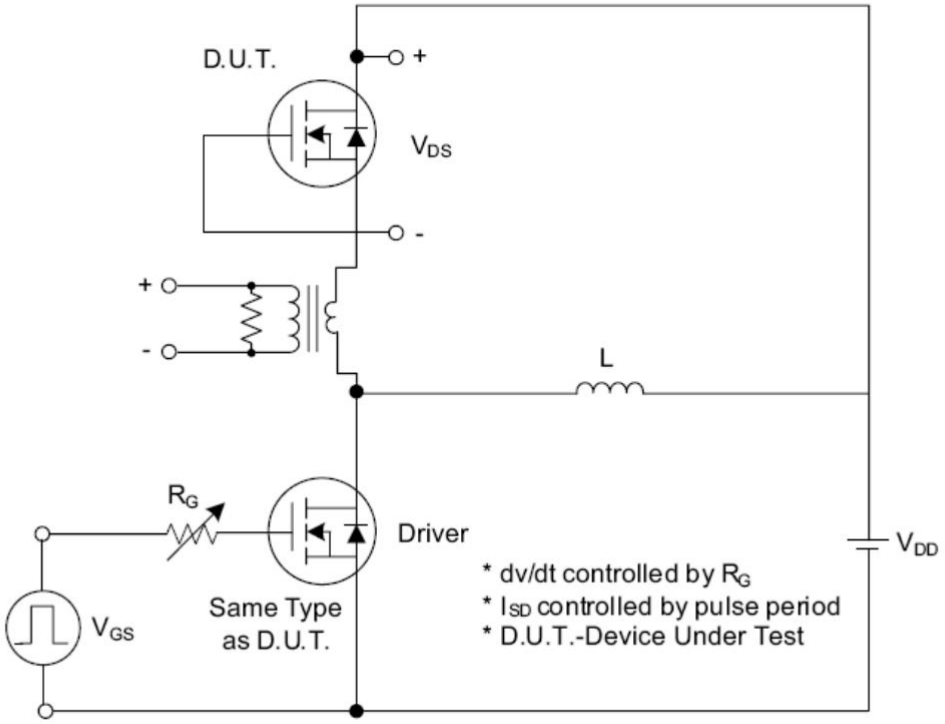


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

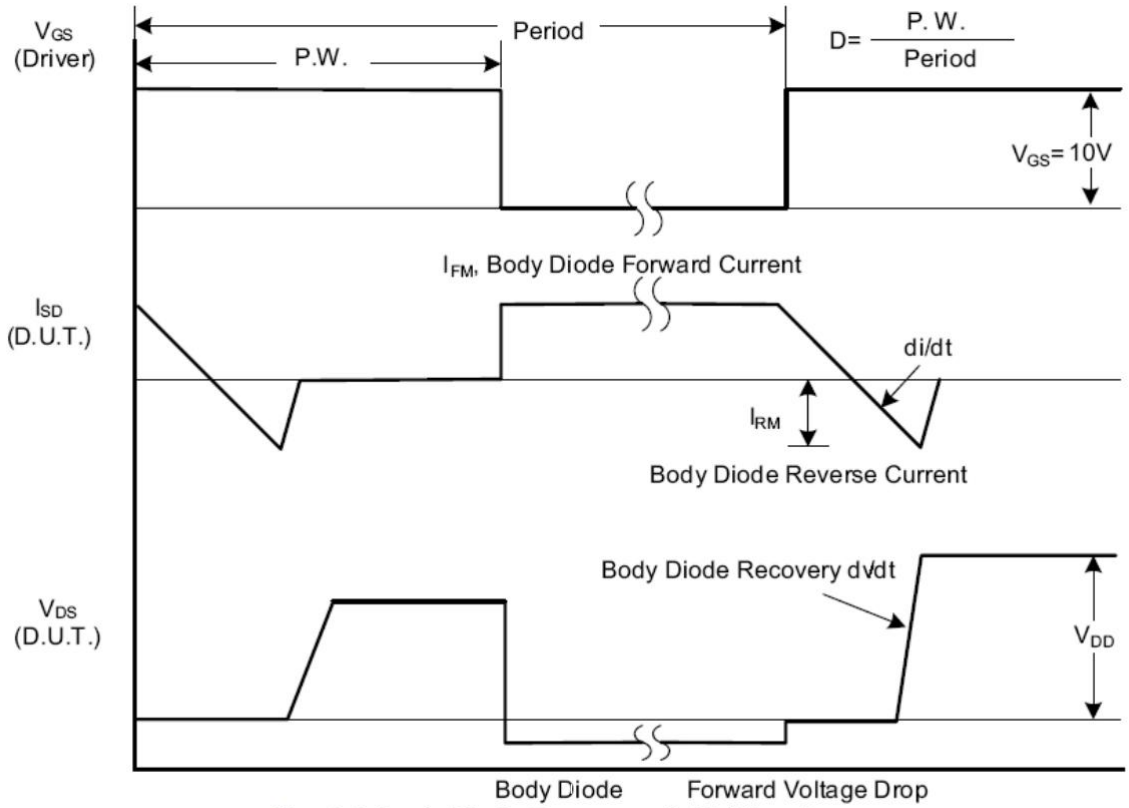


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)

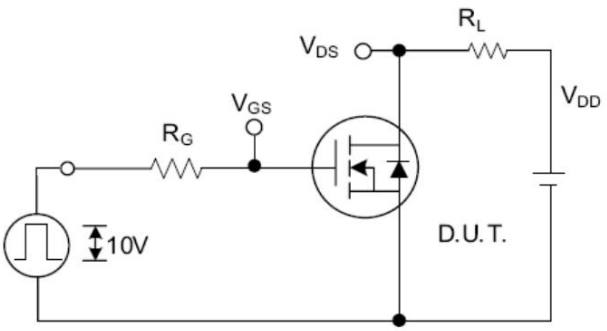


Fig. 2.1 Switching Test Circuit

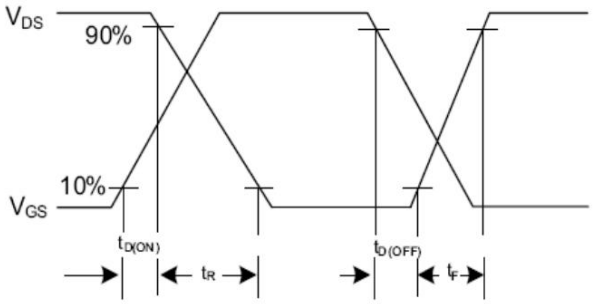


Fig. 2.2 Switching Waveforms

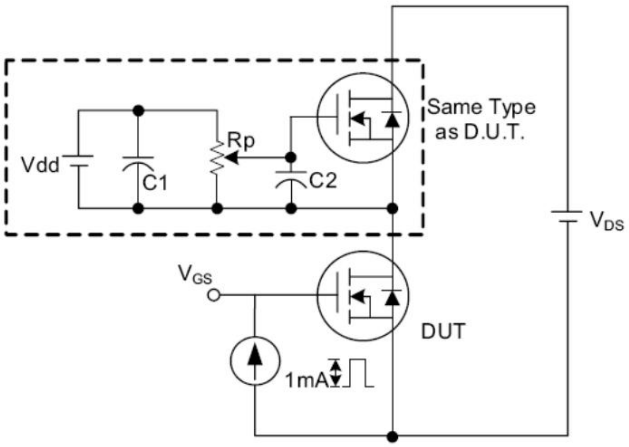


Fig. 3 . 1 Gate Charge Test Circuit

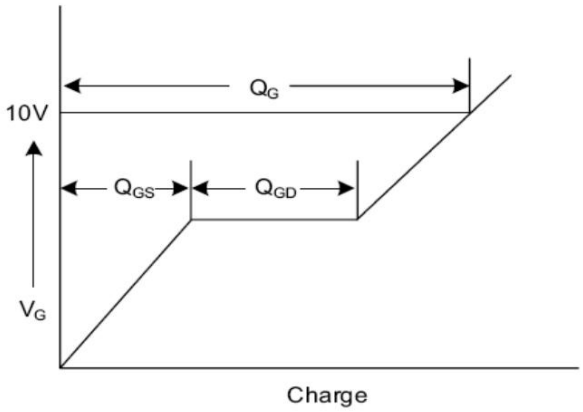


Fig. 3 . 2 Gate Charge Waveform

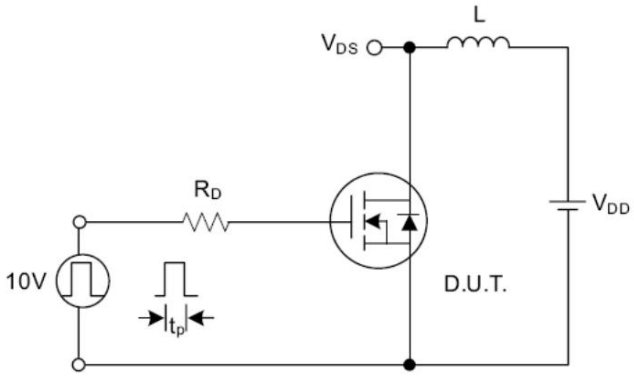


Fig. 4.1 Unclamped Inductive Switching Test Circuit

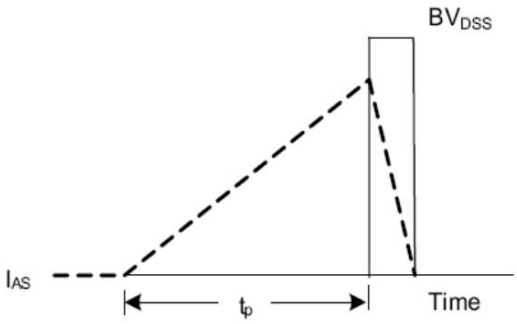
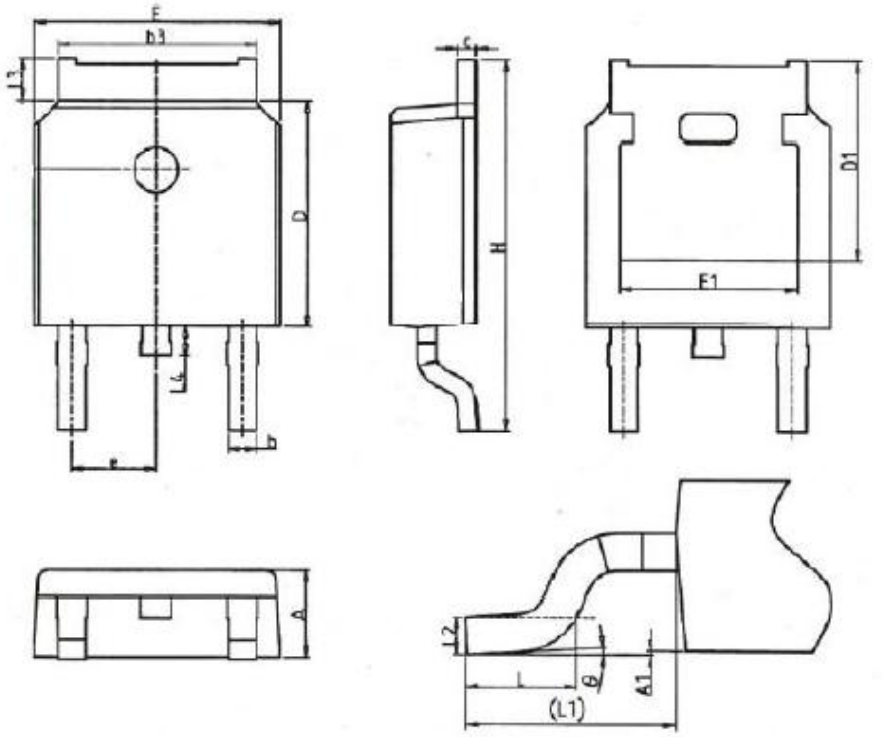


Fig. 4.2 Unclamped Inductive Switching Waveforms

TO252-2L Package Outline



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.18	2.40	0.086	0.095
A1	-	0.2	-	0.008
b	0.68	0.9	0.026	0.036
b3	4.95	5.46	0.194	0.215
c	0.43	0.89	0.017	0.035
D	5.97	6.22	0.235	0.245
D1	5.300REF		0.209REF	
E	6.35	6.73	0.250	0.265
E1	4.32	--	0.170	-
e	2.286BSC		0.09BSC	
H	9.4	10.5	0.370	0.413
L	1.38	1.78	0.054	0.070
L1	2.90REF		0.114REF	
L2	0.51BSC		0.020BSC	
L3	0.88	1.28	0.034	0.050
L4	0.5	1	0.019	0.039
Θ	0°	8°	0°	8°