FH1806D2

N-Channel Trench Power MOSFET

Description

N-Channel Power MOSFET designed by Company, according to the advanced TrenchTechnology. This devices provide an excellent gate charge and $R_{DS(on)}$, which leads to extremely communication and conduction losses. So it is very suitable for AC/DC power conversion, load switch and industrial power applications.

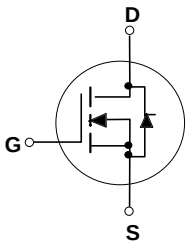
General Features

- V_{DSS}= 60V , ID=80A
  $R_{DS(ON)}$ =7.9mΩ (MAX) @V_{GS} =10V
- 100% avalanche tested
- Easy to use/drive
- RoHS compliant

Applications

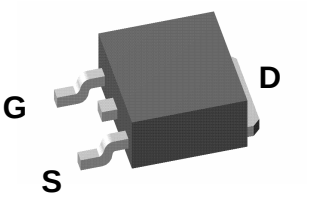
- DC/DC Converter
- Battery Protection Charge/Discharge
- Load Switch
- Synchronous Rectification

TO-252



Schematic diagram

Marking and pin assignment



TO-252 top view

Absolute Maximum Ratings T_A = 25ºC, unless otherwise noted

Parameter		Symbol	Values	Unit
Drain-Source Voltage(V_{GS}=0V)		V_{DS}	60	V
Continuous Drain Current[2]	T_C = 25ºC	I_D	80	A
	T_C = 100ºC		51	
Pulsed Drain Current[3]		$I_{D,pulse}$	320	A
Gate-Source Voltage		V_{GSS}	±20	V
Single Pulse Avalanche Energy[1]		E_{AS}	244	mJ
Power Dissipation		P_D	83	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	ºC
Thermal Resistance, Junction-to-Case		R_{thJC}	1.5（MAX）	ºC/W
Thermal Resistance, Junction-to-Ambient		R_{thJA}	62（MAX）	ºC/W

Notes

1) L=0.5mH, V_{DD}=30V, Start T_J=25℃.

2) Limited by maximum junction temperature.

3) Repetitive Rating: Pulse width limited by maximum junction temperature.

Electrical Characteristics T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	60	66	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60V V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
		V_{DS} = 60V V_{GS} = 0V, T_J = 125ºC	--	--	100	
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	2.8	4	V
Drain-Source On-State-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	6.5	7.9	mΩ
Gate Resistance	R_G	f = 1.0MHz open drain	--	1.6	--	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 30V f = 1.0MHz	--	4009	--	pF
Output Capacitance	C_{oss}		--	243	--	
Reverse Transfer Capacitance	C_{rss}		--	201	--	
Total Gate Charge	Q_g	V_{DS} = 30V, I_D = 20A V_{GS} = 10V	--	76	--	nC
Gate-Source Charge	Q_{gs}		--	17	--	
Gate-Drain Charge	Q_{gd}		--	19	--	
Gate Plateau Voltage	$V_{Plateau}$		--	4.3	--	V
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 30V, V_{GS} =10V R_G = 3Ω, I_D = 20A	--	19	--	ns
Turn-on Rise Time	t_r		--	42	--	
Turn-off Delay Time	$t_{d(off)}$		--	48	--	
Turn-off Fall Time	t_f		--	29	--	
Drain-Source Body Diode Characteristics						
Body Diode Forward Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 20A V_{GS} = 0V	--	--	1.2	V
Continuous Diode Forward Current	I_S		--	--	80	A
Reverse Recovery Time	t_{rr}	I_F = 20A, di_F/dt = 100A/μs	--	28	--	ns
Reverse Recovery Charge	Q_{rr}		--	52	--	nC

Typical Characteristics T_J = 25ºC, unless otherwise noted

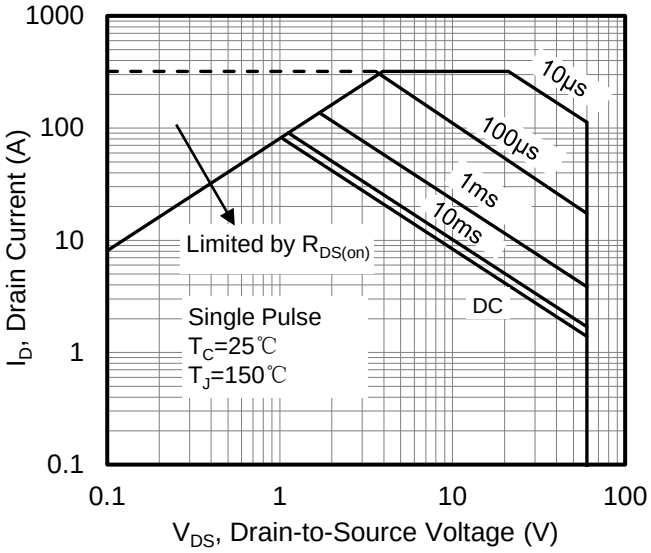


Figure 1. Maximum Safe Operating Area

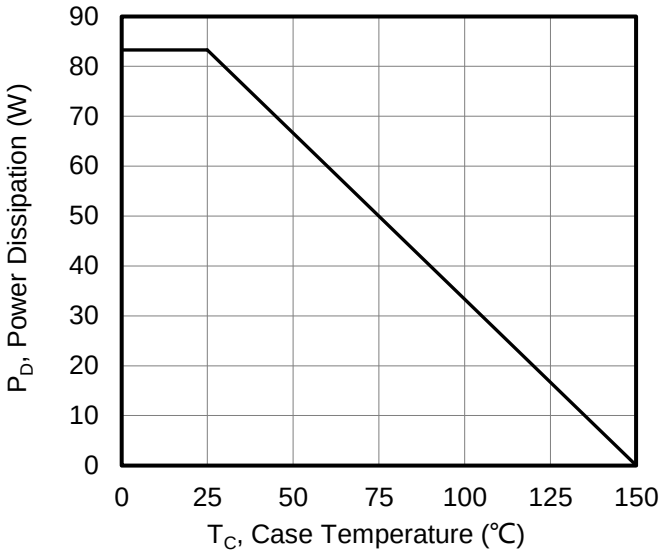


Figure 2. Maximum Power Dissipation vs Case Temperature

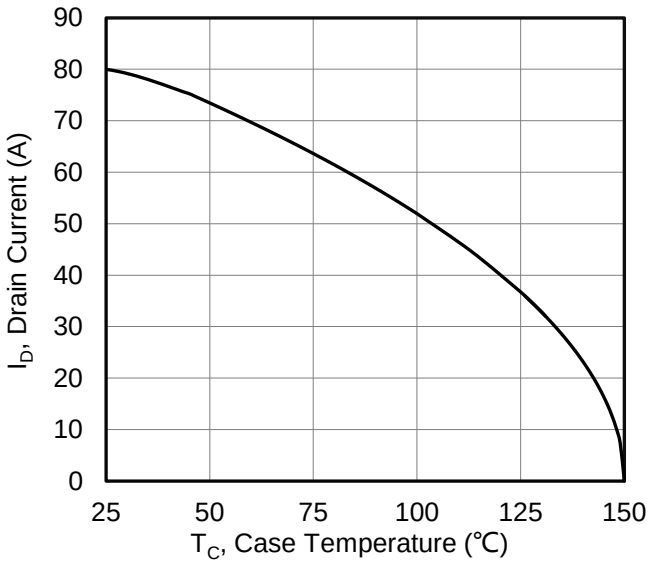


Figure 3. Maximum Continuous Drain Current vs Case Temperature

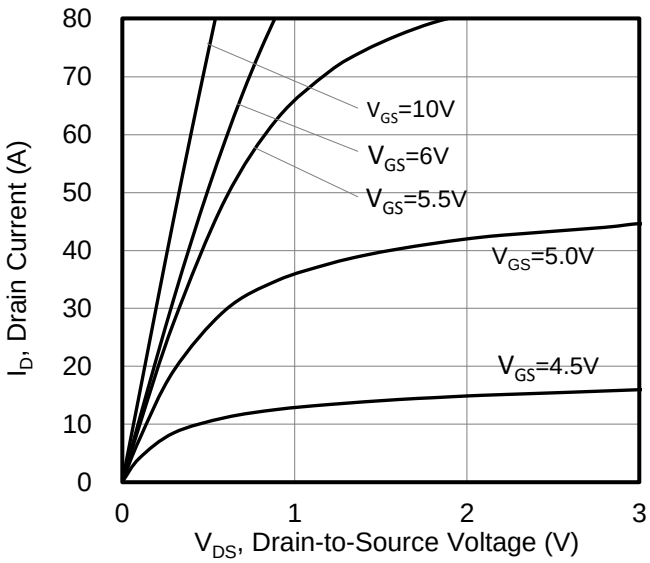


Figure 4. Typical output Characteristics

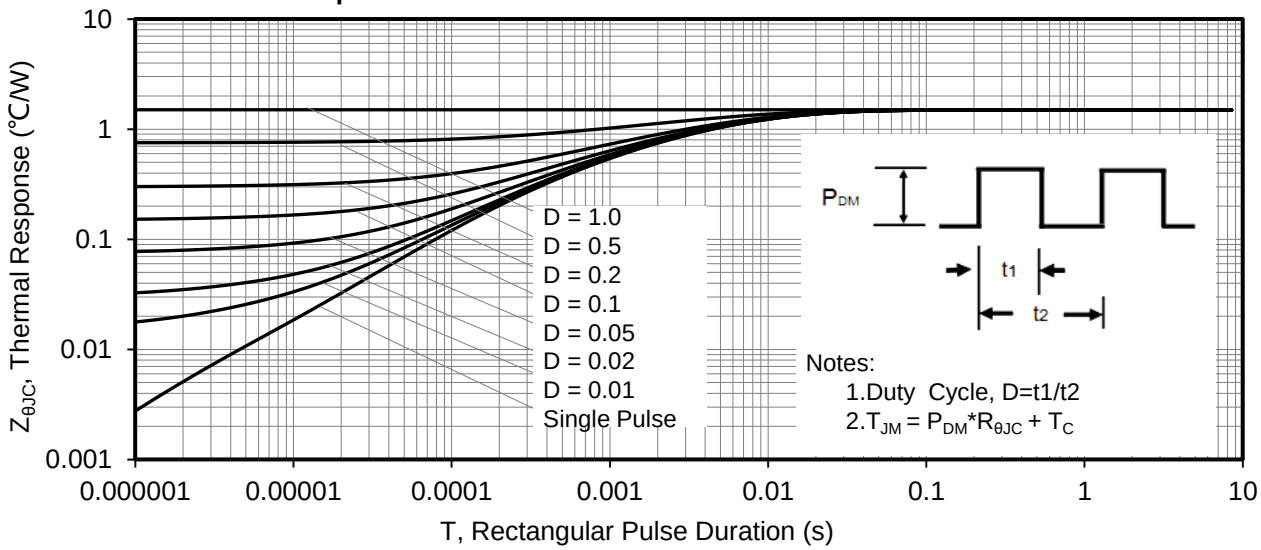


Figure 5. Maximum Effective Thermal Impedance, Junction to Case

Typical Characteristics T_J = 25ºC, unless otherwise noted

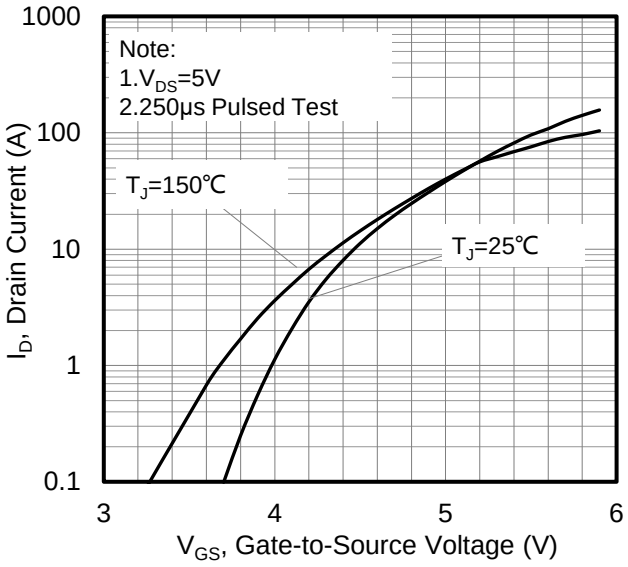


Figure 6. Typical Transfer Characteristics

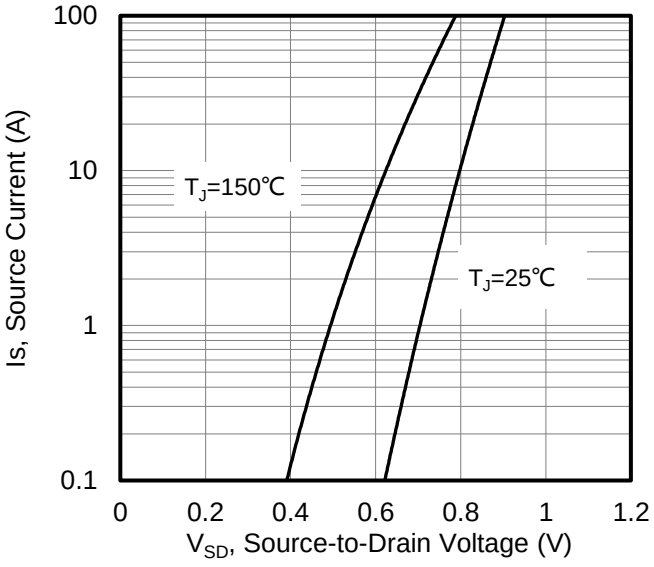


Figure 7. Typical Body Diode Transfer Characteristics

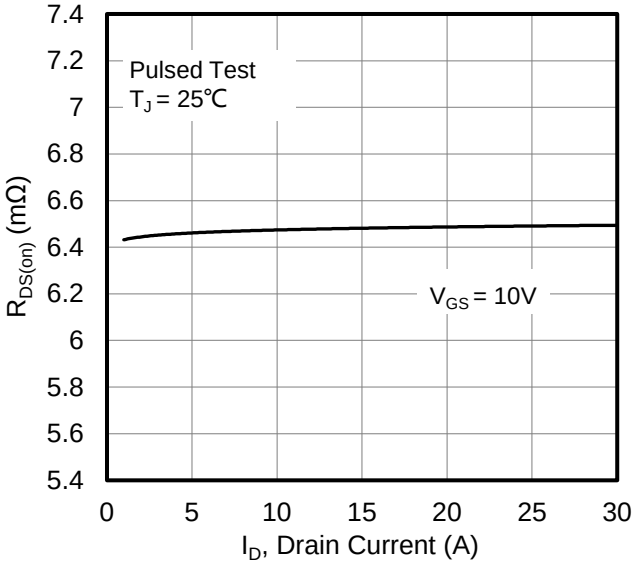


Figure 8. Drain-to-Source On Resistance vs Drain Current

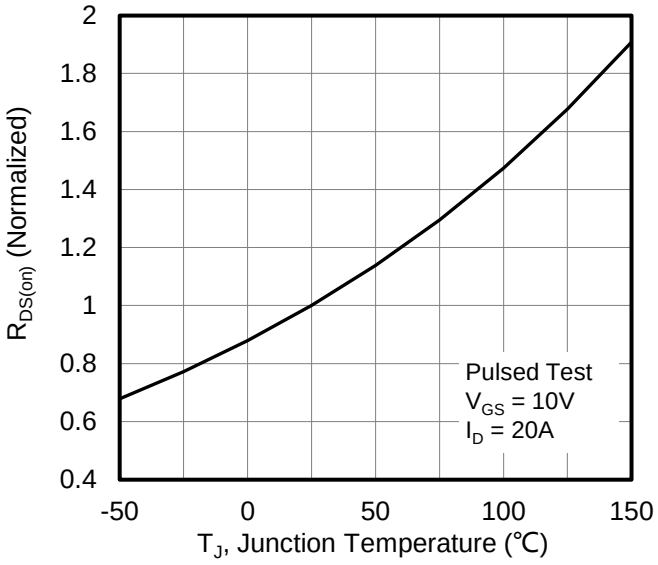


Figure 9. Normalized On Resistance vs Junction Temperature

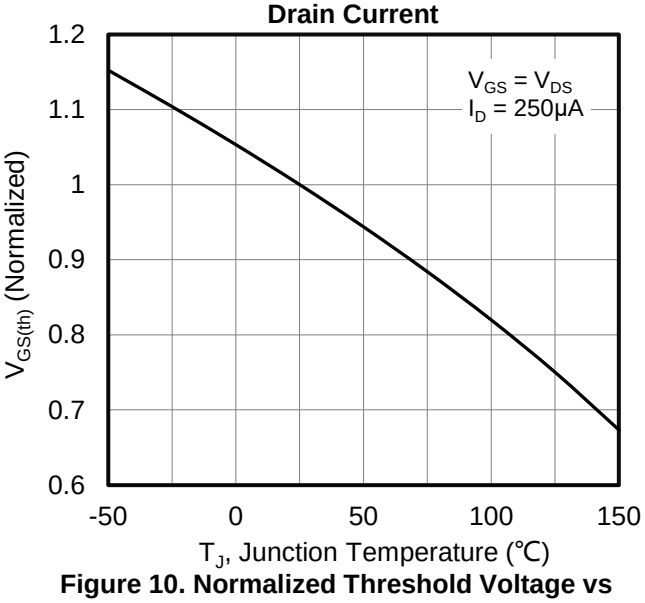


Figure 10. Normalized Threshold Voltage vs Junction Temperature

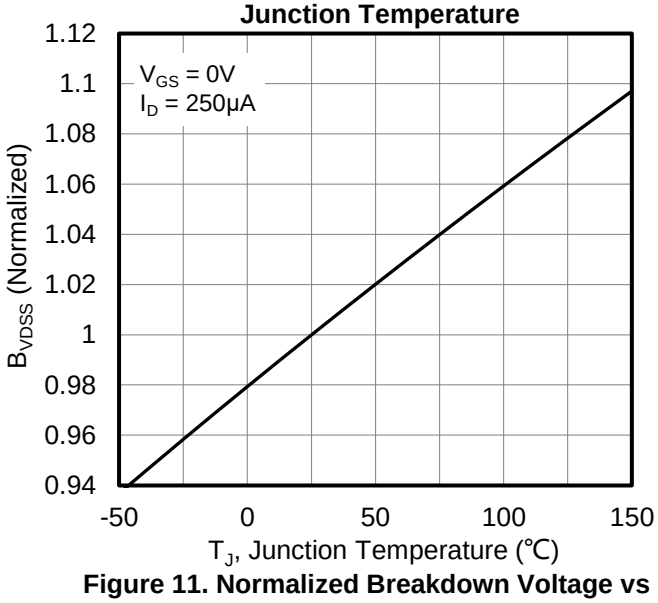


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

Typical Characteristics T_J = 25ºC, unless otherwise noted

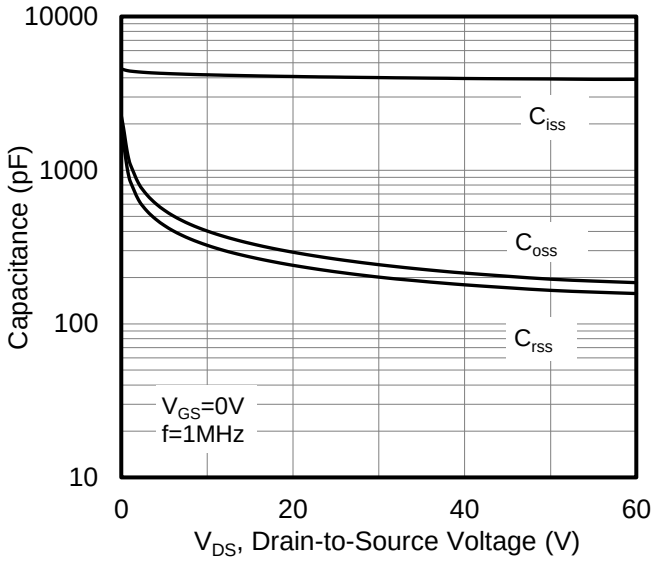


Figure 12. Capacitance Characteristics

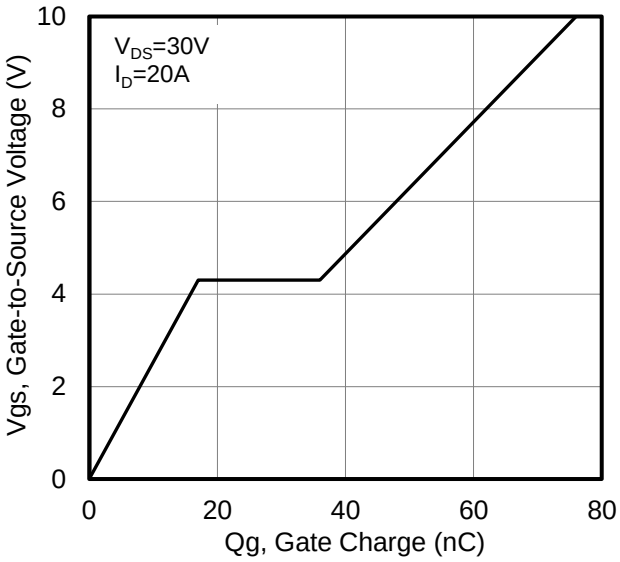


Figure 13. Typical Gate Charge vs Gate to Source Voltage

Figure A：Gate Charge Test Circuit and Waveform

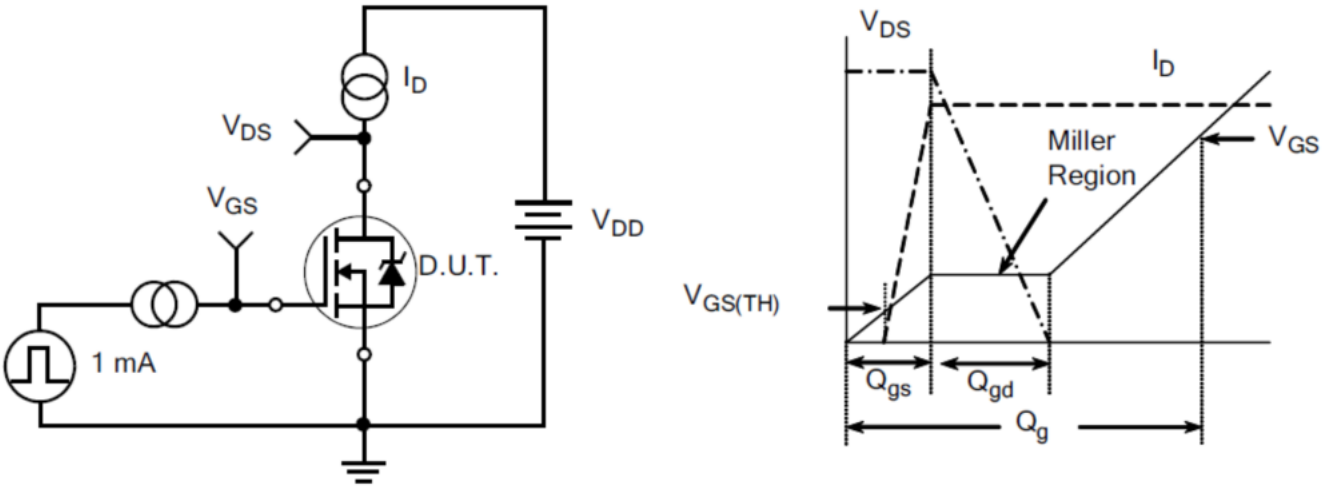


Figure B：Resistive Switching Test Circuit and Waveform

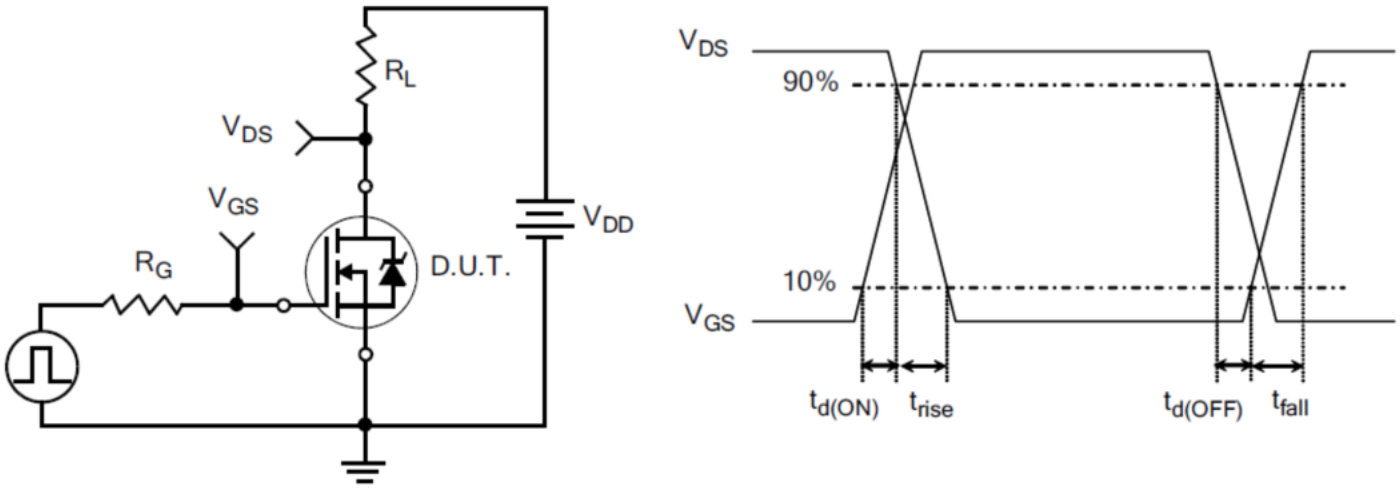
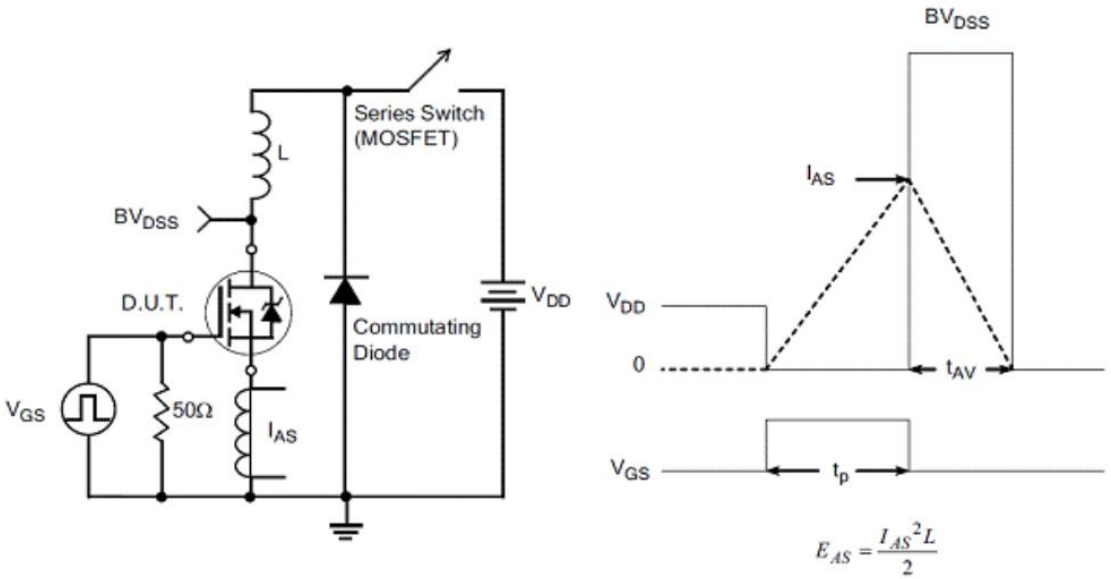
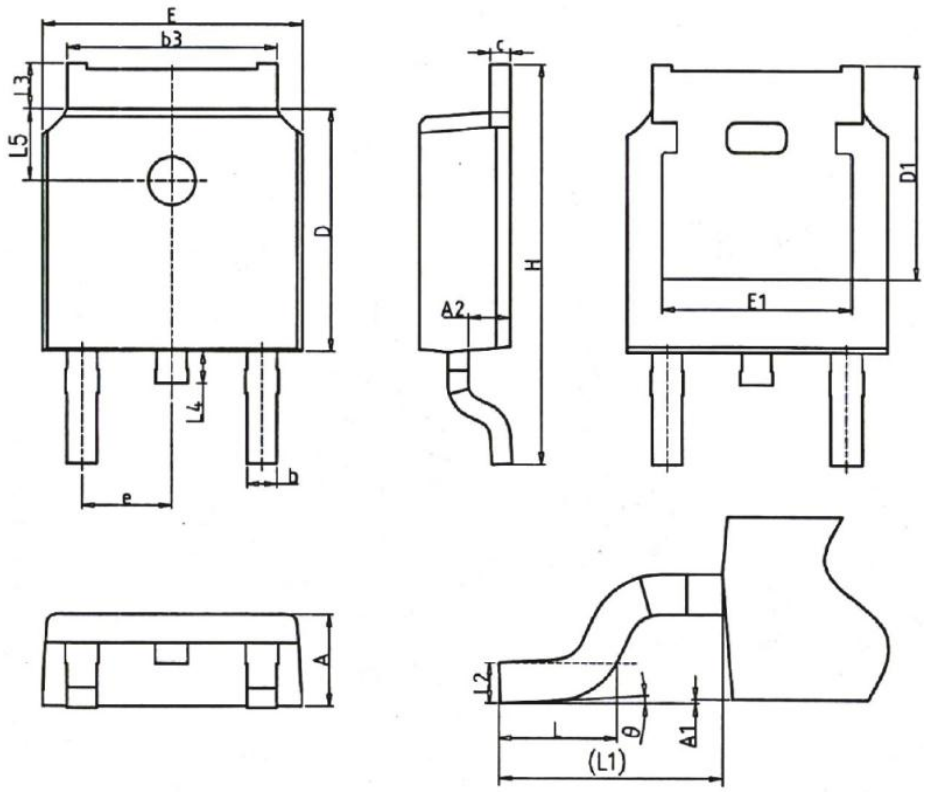


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



Package Information : TO-252



COMMON DIMENSIONS						
SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.20	2.30	2.38	0.087	0.091	0.094
A1	0.00		0.20	0.000		0.008
A2	0.97	1.07	1.17	0.038	0.042	0.046
b	0.68	0.78	0.90	0.027	0.031	0.035
b3	5.20	5.33	5.46	0.205	0.210	0.215
c	0.43	0.53	0.61	0.017	0.021	0.024
D	5.98	6.10	6.22	0.235	0.240	0.245
D1	5.30REF			0.209REF		
E	6.40	6.60	6.73	0.252	0.260	0.265
E1	4.63	-	-	0.182	-	-
e	2.286BSC			0.090BSC		
H	9.40	10.10	10.50	0.370	0.398	0.413
L	1.38	1.50	1.75	0.054	0.059	0.069
L1	2.90REF			0.114REF		
L2	0.51BSC			0.020BSC		
L3	0.88		1.28	0.035		0.050
L4	0.50		1.00	0.020		0.039
L5	1.65	1.80	1.95	0.065	0.071	0.077
θ	0°		8°	0°		8°