Leiditech

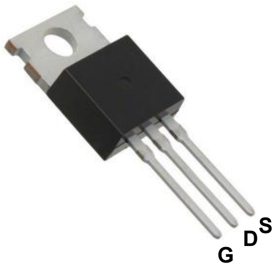
LMFB30N20

200V N-Channel Enhancement Mode MOSFET

Description

These N-channel enhanced vdmosfets, is obtained by the self-aligned planar technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. Which accords with the RoHS standard.

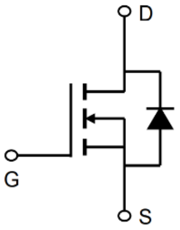
Dimensions TO-220F



General Features

- Fast switching
- Low on resistance(Rdson≤80mΩ)
- Low gate charge(Typ: 38nC)
- Low reverse transfer capacitances(Typ: 24pF)
- 100% single pulse avalanche energy test
- 100% ΔV_{DS} test

Pin Configuration



Application

- High efficiency switch mode power supplies.
- Power switch circuit of adaptor and charger.
- UPS
- Inverter

Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LMFB30N20	-	TO-220F	-	-	1000 units

Absolute Maximum Ratings (TC=25℃ unless otherwise noted)

Parameter		Symbol	Rating		Units
Drian-to-Source Voltage		V_{DSS}	200		V
Gate-to-Source Voltage		V_{GSS}	±30		V
Continuous Drain Current	T_C=25℃	I_D	30		A
	T_C=100℃		18.9		A
Pulsed Drain Current(1)		I_{DM}	120		A
Single Pulse Avalanche Energy(4)		E_{AS}	1050		mJ
Peak Diode Recovery dv/dt(5)		dv/dt	5		V/ns
Power Dissipation	T_a=25℃	P_{tot}	2	2	W
	T_C=25℃	P_{tot}	150	50	W
Isolation Voltage		V_{ISO}	/	2500	V
Junction Temperature Range		T_j	-55～150		℃
Storage Temperature Range		T_{stg}	-55～150		℃
Maximum Temperature for soldering		T_L	300		℃

Thermal Characteristics

Parameter	Symbol	Rating		Unit
Thermal Resistance,Junction to Case-sink	R_{thJC}	0.83	2.5	℃/W
Thermal Resistance,Junction to Ambient	R_{thJA}	62.5	62.5	℃/W

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

Parameter	Symbol	Test Condition	Value			Units
			Min	Typ	Max	
Off Characteristics						
Drain-to-Source Breakdown Voltage	BV_{DSS}	I_D=250μA,V_{GS}=0V	200	--	--	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=200V,V_{GS}=0V,T_C=25℃	--	--	10	μA
		V_{DS}=160V,V_{GS}=0V,T_C=125℃	--	--	100	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±30V	--	--	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2	--	4	V
Drain-to-Source on-state Resistance	$R_{DS(on)}$	V_{GS}=10V,I_D=15A	--	70	80	mΩ
Forward Transfer Conductance	g_{fs}	V_{DS}=15V,I_D=15A	--	14.5	--	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V,V_{DS}=25V,f=1.0MHz	--	1945	--	pF
Output Capacitance	C_{oss}		--	300	--	
Reverse Transfer Capacitance	C_{rss}		--	24	--	
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	I_D=30A, V_{DD}=100V, V_{GS}=10V, R_G=3.9Ω	--	13	--	nS
Turn-on Rise Time	t_r		--	24	--	
Turn-off Delay Time	$t_{d(off)}$		--	32	--	
Turn-off Fall Time	t_f		--	6	--	
Total Gate Charge	Q_g	I_D=30A,V_{DD}=100V,V_{GS}=10V	--	38	--	nC
Gate-to-Source Charge	Q_{gs}		--	12	--	
Gate-to-Drain("Miller") Charge	Q_{gd}		--	13	--	
Drain-Source Diode Characteristics						
Diode Forward Voltage(3)	V_{FSD}	V_{GS}=0V,I_S=30A	--	--	1.5	V
Diode Forward Current	I_S		--	--	30	A
Reverse Recovery Time(3)	t_{rr}	T_J=25℃,I_F=30A, dI_F/dt=100A/μS,V_{GS}=0V	--	230	--	nS
Reverse Recovery Charge(3)	Q_{rr}		--	1037	--	nC

Notes：

1: Repetitive rating, pulse width limited by maximum junction temperature.

2: Surface mounted on FR4 Board, t≤10sec.

3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

4. L=10mH,I_D=14.5A,V_{DD}=50V,V_{GATE}=200V,Start T_J=25℃.

5. I_{SD}=30A,di/dt≤100A/μs,V_{DD}≤BV_{DSS}, Start T_J=25℃.

Typical Electrical and Thermal Characteristics

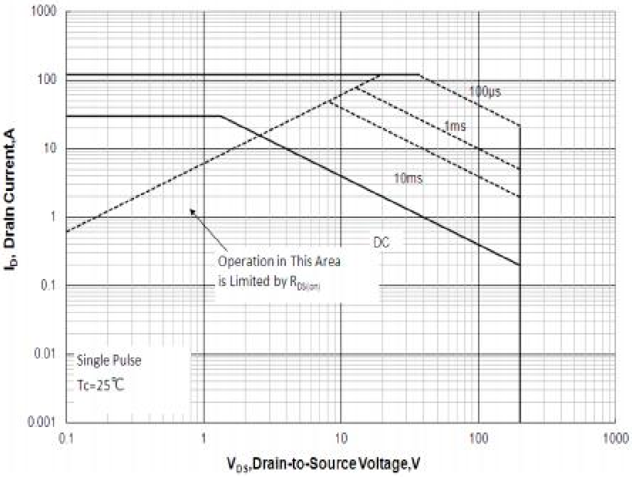


Figure 1 Maximum Forward Bias Safe Operating Area

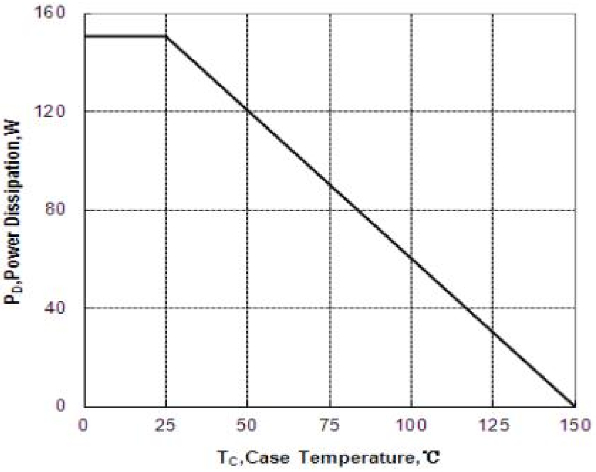


Figure 2 Maximum Power dissipation vs Case Temperature

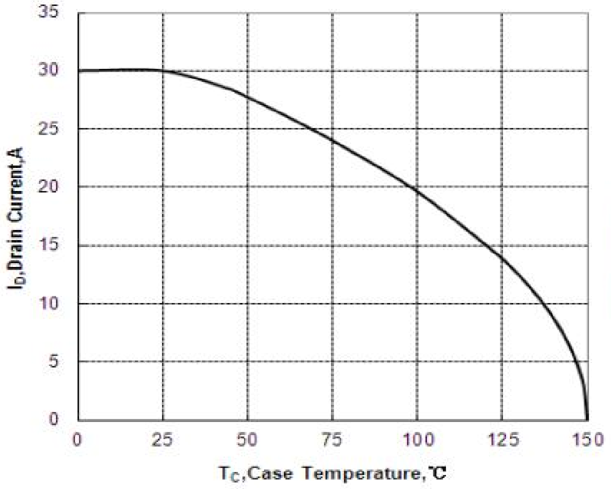


Figure 3 Maximum Continuous Drain Current vs Case Temperature

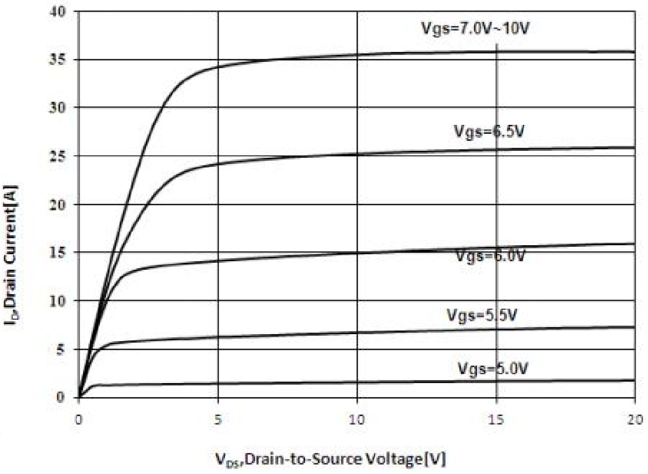


Figure 4 Typical Output Characteristics

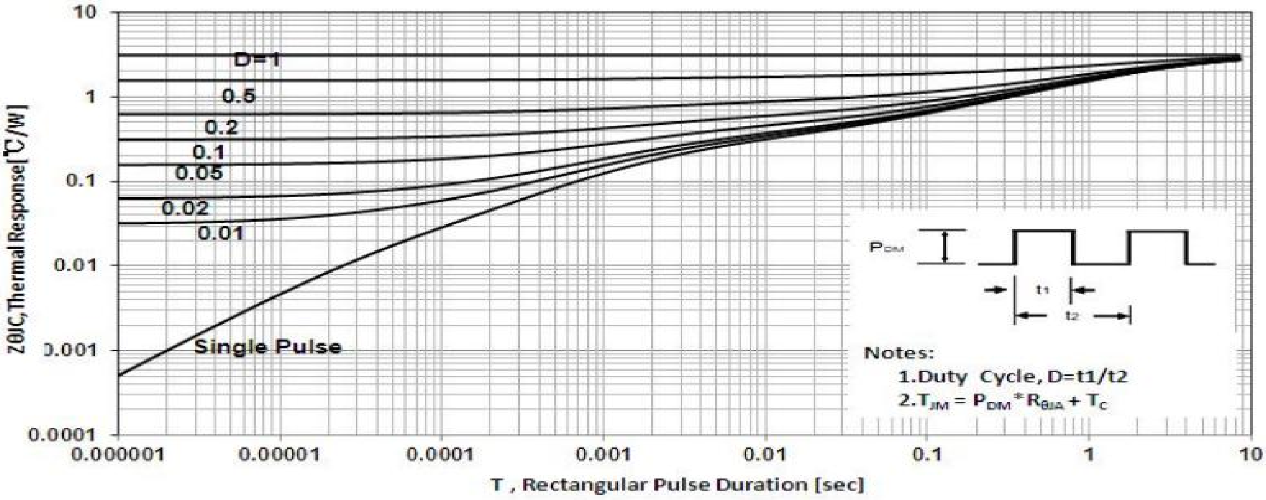
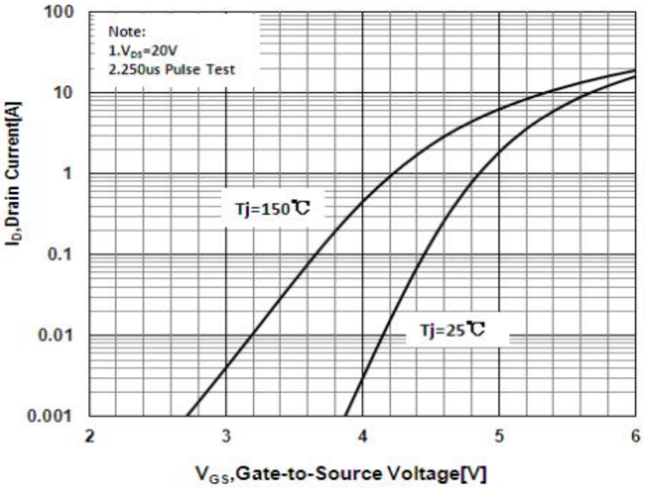


Figure 5 Maximum Effective Thermal Impedance , Junction to Case



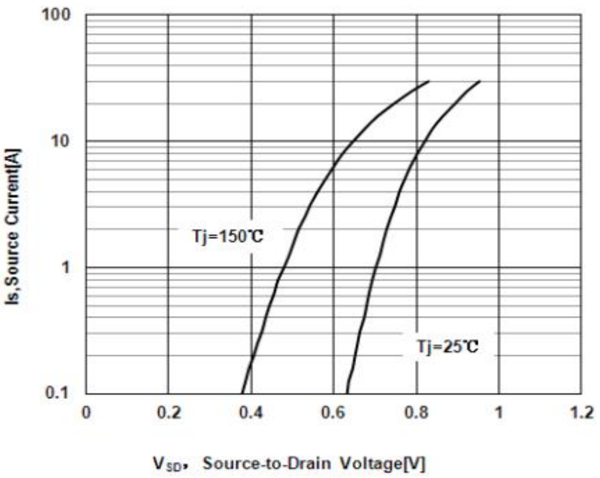
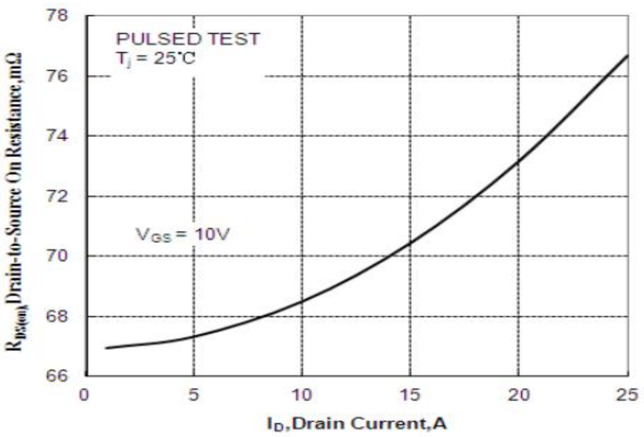


Figure 6 Typical Transfer Characteristics

Figure 7 Typical Body Diode Transfer Characteristics



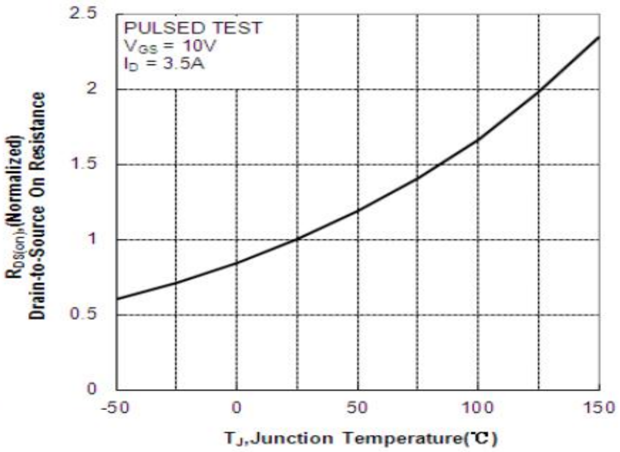
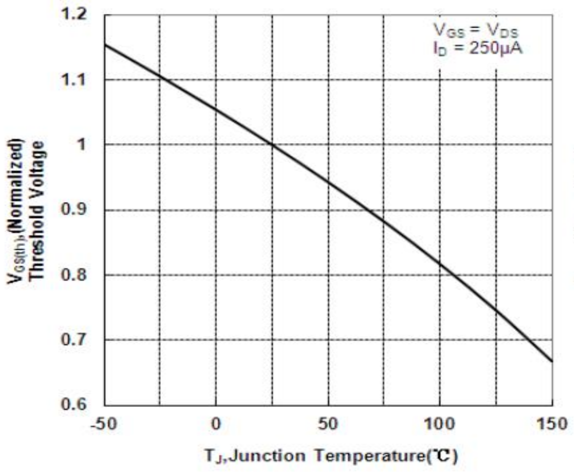


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

Figure 9 Typical Drian to Source on Resistance vs Junction Temperature



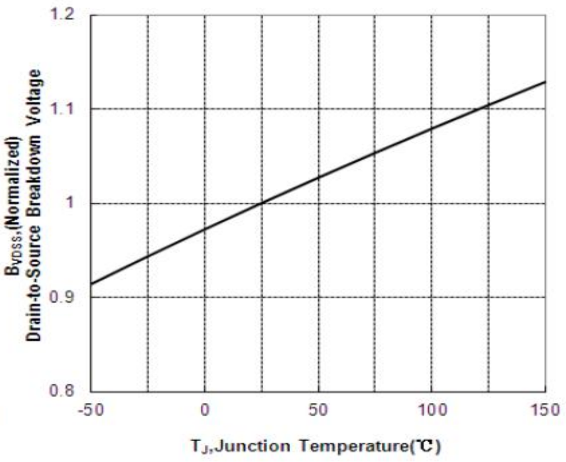


Figure 10 Typical Theshold Voltage vs Junction Temperature

Figure 11 Typical Breakdown Voltage vs Junction Temperature

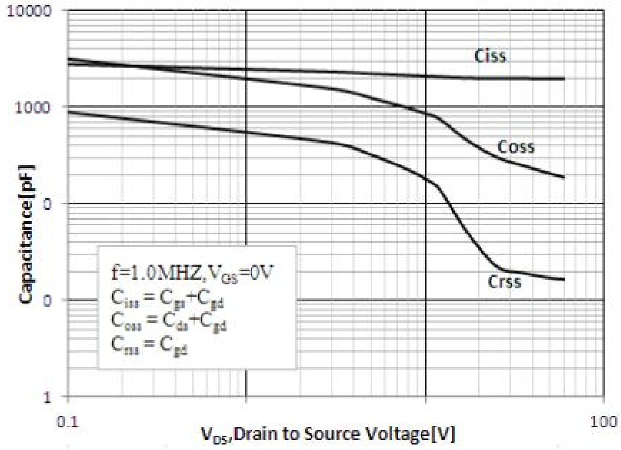


Figure 12 Typical Capacitance vs Drain to Source Voltage

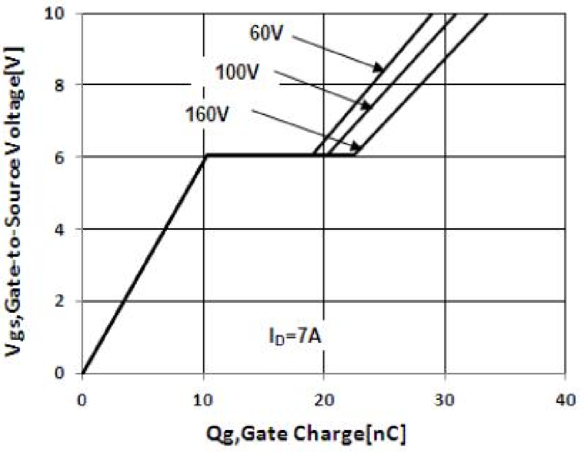
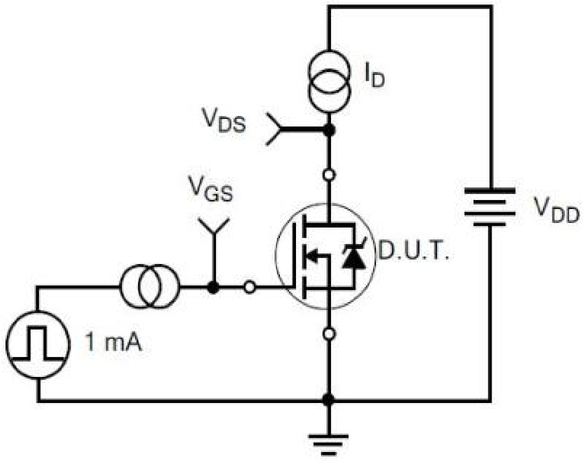
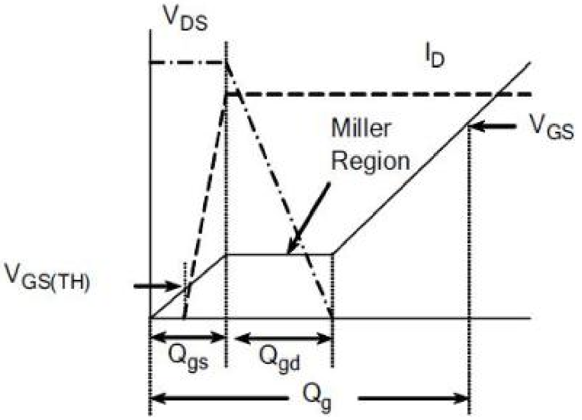


Figure 13 Typical Gate Charge vs Gate to Source Voltage

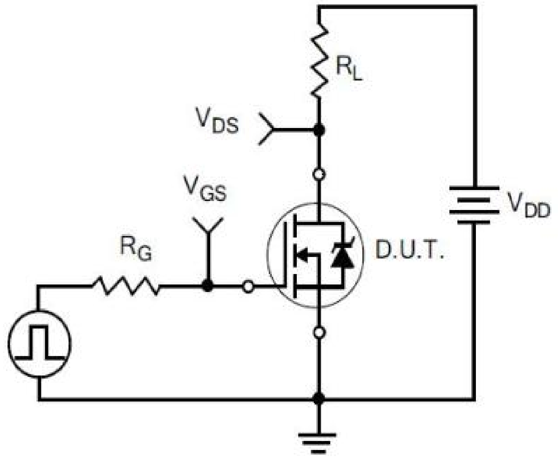
Typical Test Circuit and Waveform



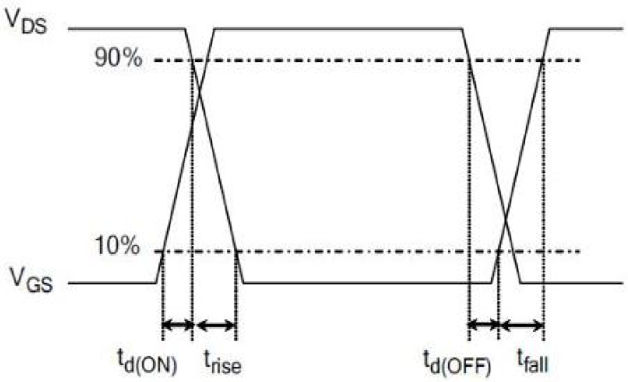
1) Gate Charge Test Circuit



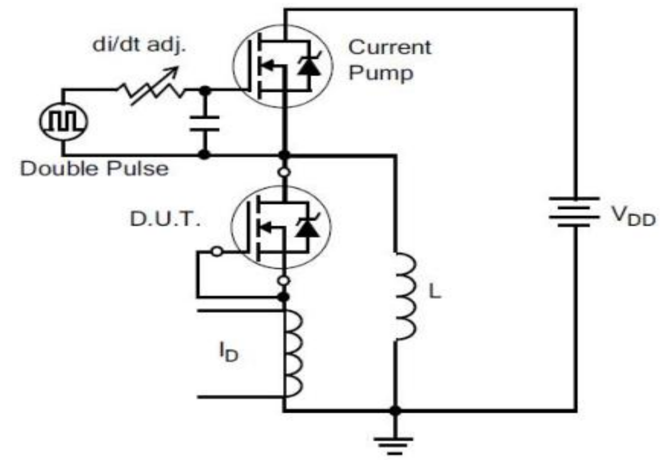
2) . Gate Charge Waveform



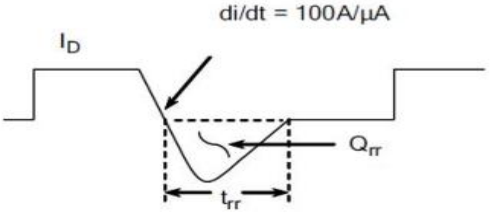
3) Resistive Switching Test Circuit



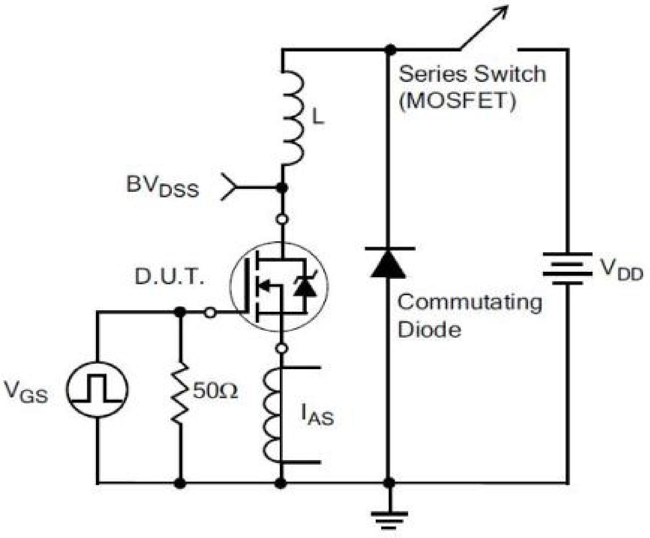
4) Resistive Switching Waveforms



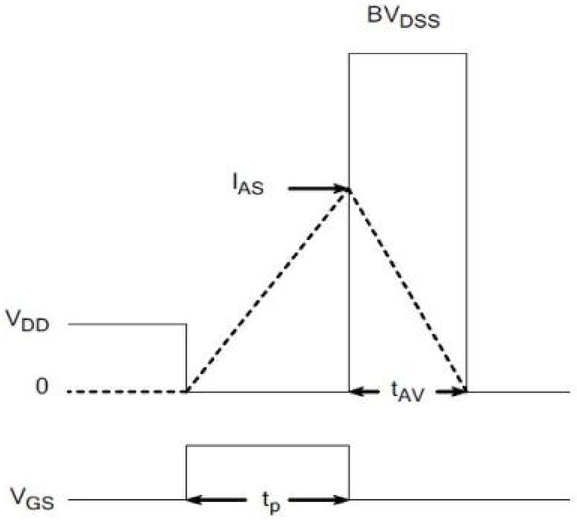
5) Diode Reverse Recovery Test Circuit



6) Diode Reverse Recovery Waveform



7) . Unclamped Inductive Switching Test Circuit

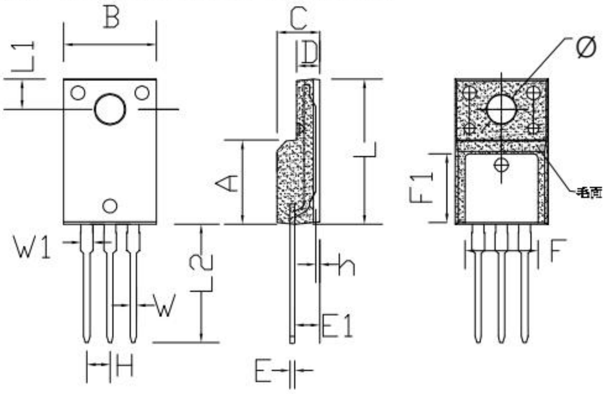


$$E_{AS} = \frac{I_{AS}{}^2 L}{2}$$

8) Unclamped Inductive Switching Waveforms

TO-220F Package Information

TO-220F PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	8.80	9.30	0.346	0.366
B	10.00	10.50	0.394	0.413
C	4.30	4.90	0.169	0.193
D	2.30	2.70	0.091	0.106
L	15.55	16.15	0.612	0.636
h	0.40	0.60	0.016	0.024
L1	3.15	3.55	0.124	0.140
L2	12.65	13.35	0.498	0.526
W	0.70	0.90	0.028	0.035
W1	1.15	1.55	0.045	0.061
H	2.54 TYP		0.100 TYP	
E	0.48	0.53	0.019	0.021
Φ	2.90	3.40	0.114	0.134
E1	2.40	2.90	0.094	0.114
F	7.75	8.25	0.305	0.325
F1	7.35	7.85	0.289	0.309