N-Channel Enhancement Mode Field Effect Transistor

Product Summary

V_{DS}	120V
I_D	50A
$R_{DS(ON)}$(at V_{GS}=10V)	10m
$R_{DS(ON)}$(at V_{GS}=4.5V)	11m

100% EAS Tested
100% V_{DS} Tested

General Description

Split gate trench MOSFET technology
Excellent package for heat dissipation
High density cell design for low $R_{DS(ON)}$
Epoxy Meets UL 94 V-0 Flammability Rating
Halogen Free

Applications

Power switching application
Uninterruptible power supply
DC-DC convertor

Absolute Maximum Ratings (T_A=25 unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	120	V
Gate-source Voltage		V_{GS}	±20	V
Drain Current	T_A=25	I_D	9	A
	T_A=100		5.5	
	T_C=25		50	
	T_C =100		31	
Pulsed Drain Current [A]		I_{DM}	200	A
Avalanche energy [B]		EAS	484	mJ
Total Power Dissipation [C]	T_A=25	P_D	1.9	W
	T_A=100		0.7	
	T_C=25		41	
	T_C =100		16	
Junction and Storage Temperature Range		T_J ,T_{STG}	-55 +150	

Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient [D]	Steady-State	R	50	65	/W
ase	Steady-State	R	2.5	3	

Electrical Characteristics (T_J=25 unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}= 0V, I_D	120	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V, V_{GS}=0V	-	-	1	
		V_{DS}=120V, V_{GS}=0V, Tj=150	-	-	100	
Gate-Body Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D	1	2	3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A	-	7.5	10	
		V_{GS}=10V, I_D=20A		7.5	10	
		V_{GS}=4.5V, I_D=20A	-	8.5	11	
Diode Forward Voltage	V_{SD}	I_S=25A, V_{GS}=0V	-	0.9	1.2	V
Gate resistance	R_G	f=1MHz, Open drain	-	0.8	-	
Maximum Body-Diode Continuous Current	I_S		-	-	50	A
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{DS}=60V, V_{GS}=0V, f=1MHz	-	4600	-	pF
Output Capacitance	C_{oss}		-	420	-	
Reverse Transfer Capacitance	C_{rss}		-	38	-	
Switching Parameters						
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=60V, I_D=25A	-	72	-	nC
Gate-Source Charge	Q_{gs}		-	20	-	
Gate-Drain Charge	Q_{gd}		-	8	-	
Reverse Recovery Charge	Q_{rr}	I_F=25A, di/dt=100A/us	-	195	-	nC
Reverse Recovery Time	t_{rr}		-	86	-	ns
Turn-on Delay Time	$t_{D(on)}$	V_{GS}=10V, V_{DD}=60V, I_D=25A R_{GEN}=2.2	-	19	-	ns
Turn-on Rise Time	t_r		-	36	-	
Turn-off Delay Time	$t_{D(off)}$		-	45	-	
Turn-off fall Time	t_f		-	45	-	

A. Repetitive rating; pulse width limited by max. junction temperature.
B. T_J=25 , V_{DD}=50V, V_G=10V, R_G , IAS=22A.
C. P_d is based on max. junction temperature, using junction-case thermal resistance.
D. The value of R is measured with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in the still air environment with T_A =25 . The maximum allowed junction temperature of 150 . The value in any given application depends on the user's specific board design.

Typical Electrical and Thermal Characteristics Diagrams

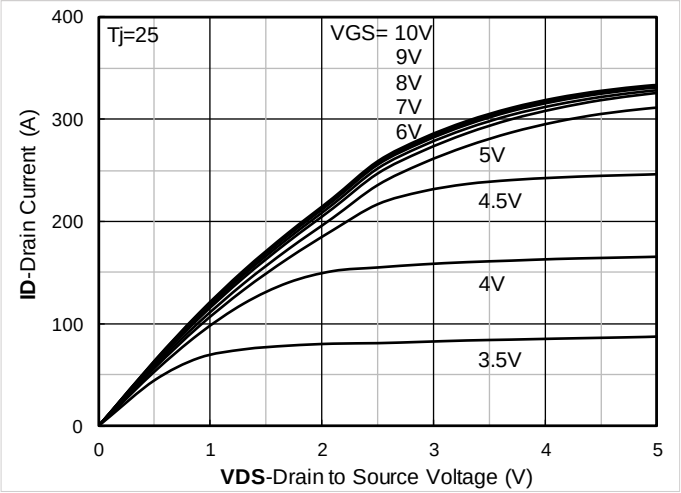


Figure 1. Output Characteristics

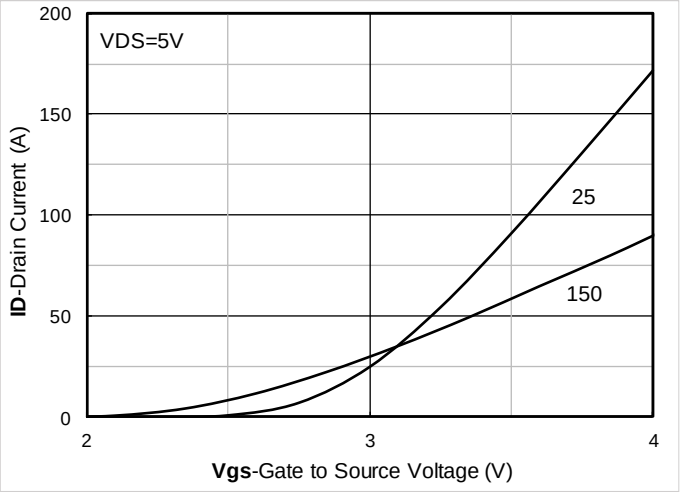


Figure 2. Transfer Characteristics

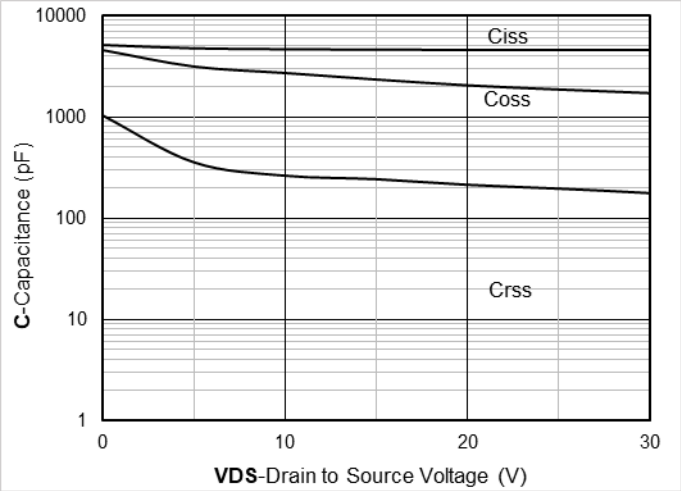


Figure 3. Capacitance Characteristics

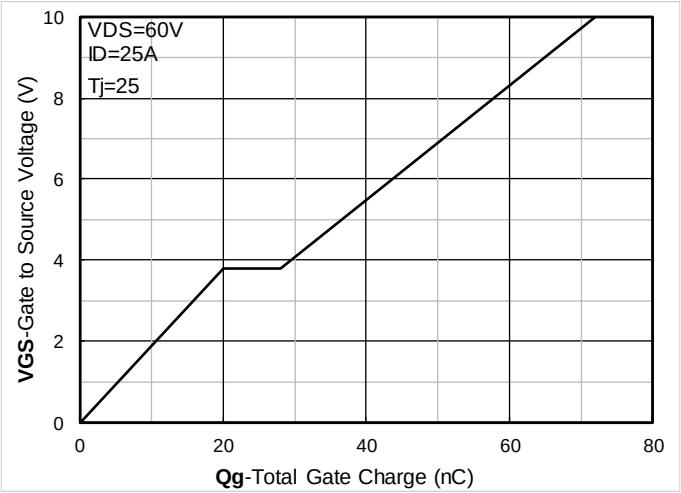


Figure 4. Gate Charge

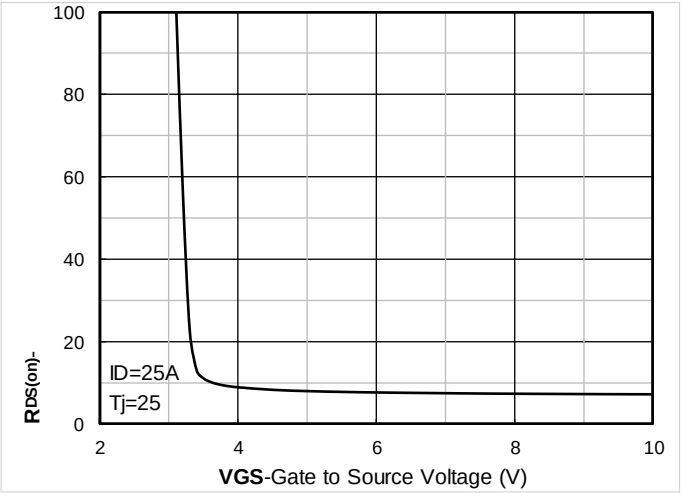


Figure 5. On-Resistance vs Gate to Source Voltage

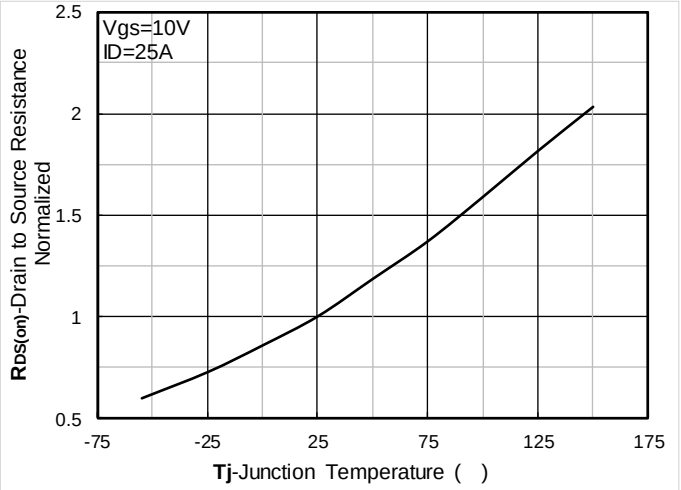


Figure 6. Normalized On-Resistance

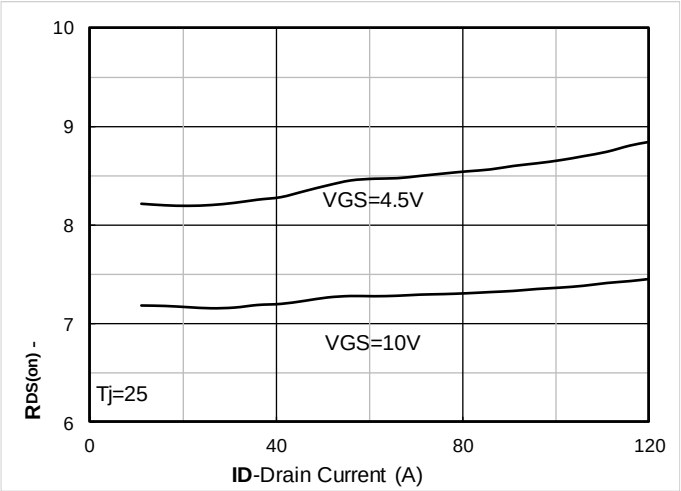


Figure 7. $R_{DS(on)}$ VS Drain Current

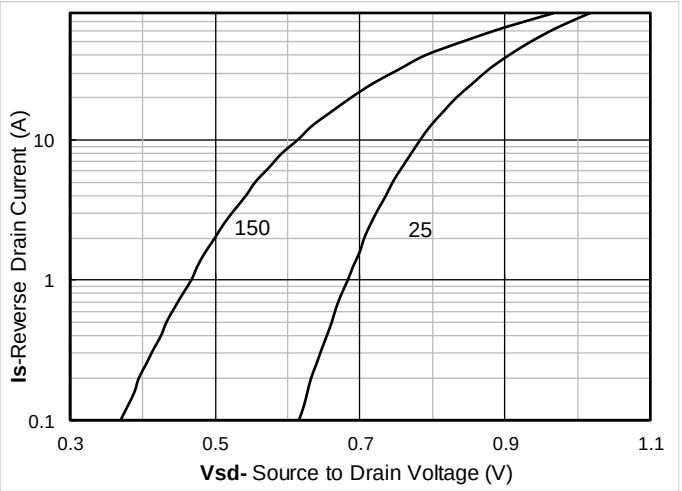


Figure 8. Forward characteristics of reverse diode

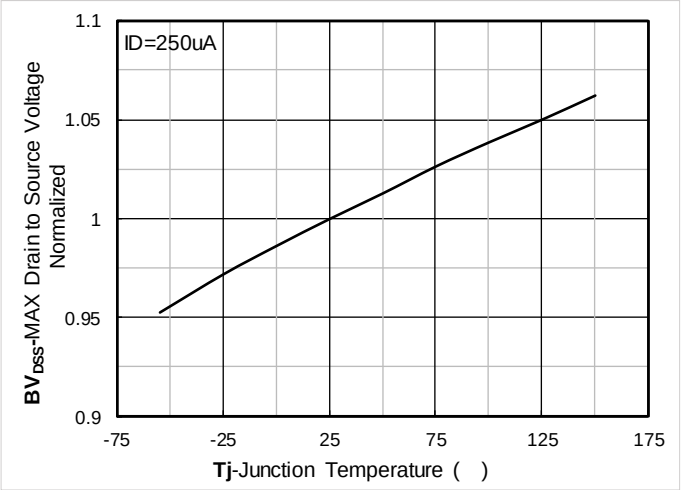


Figure 9. Normalized breakdown voltage

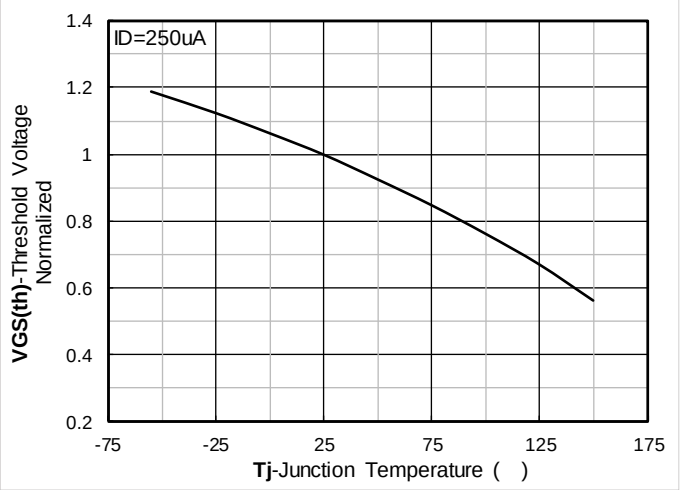


Figure 10. Normalized Threshold voltage

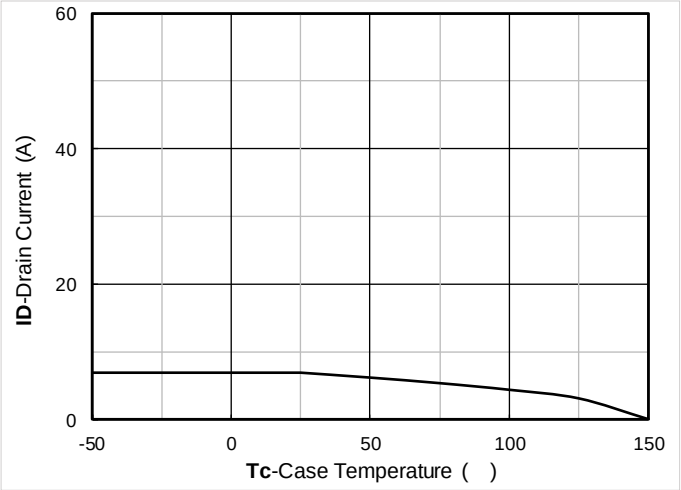


Figure 11. Current dissipation

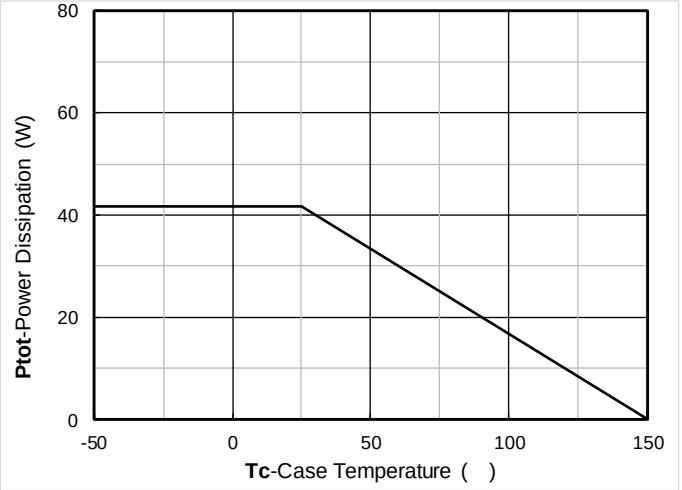


Figure 12. Power dissipation

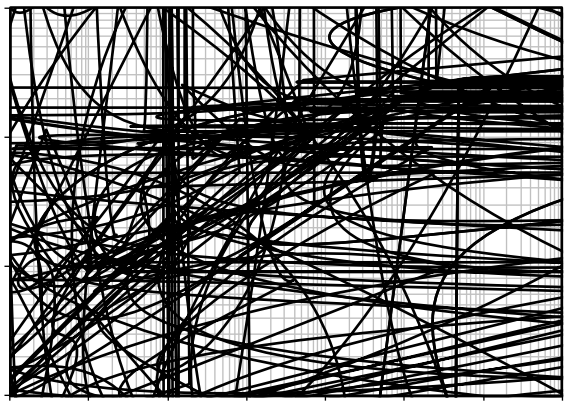


Figure 13. Maximum Transient Thermal Impedance

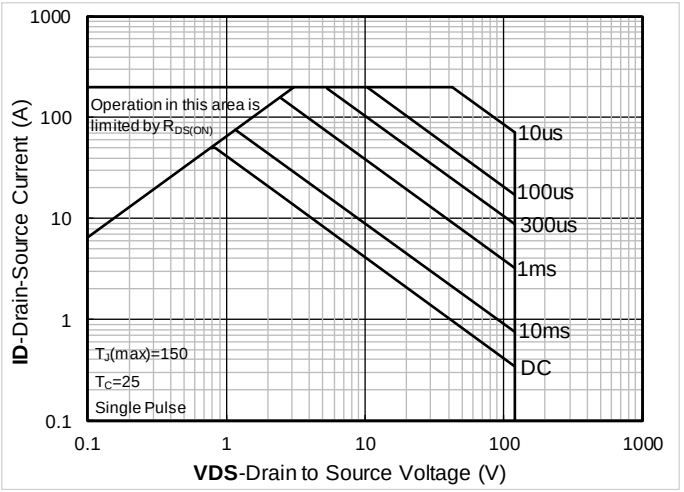


Figure 14. Safe Operation Area

Test Circuits & Waveforms

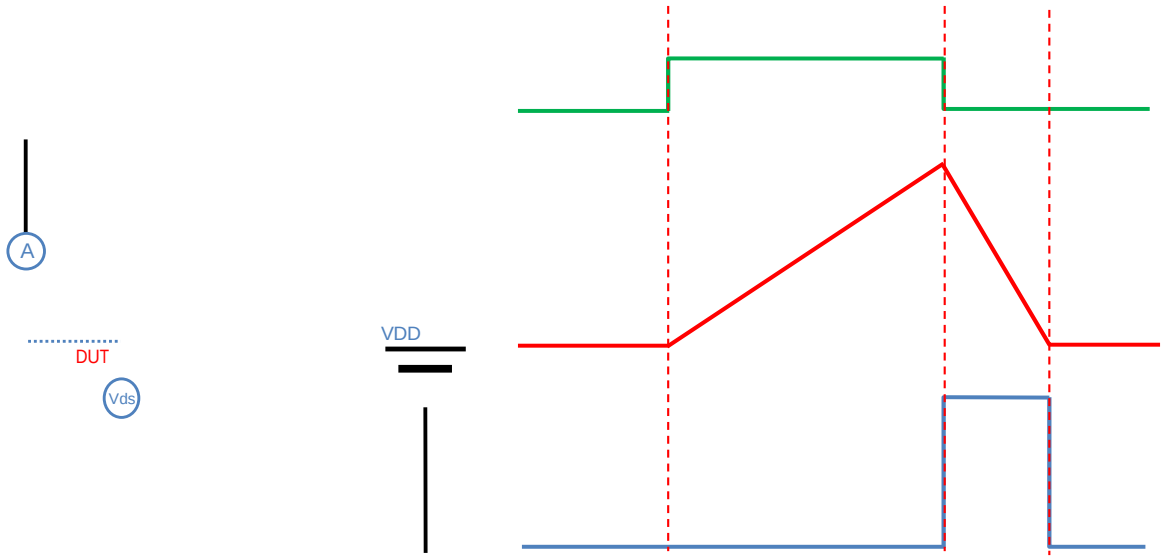
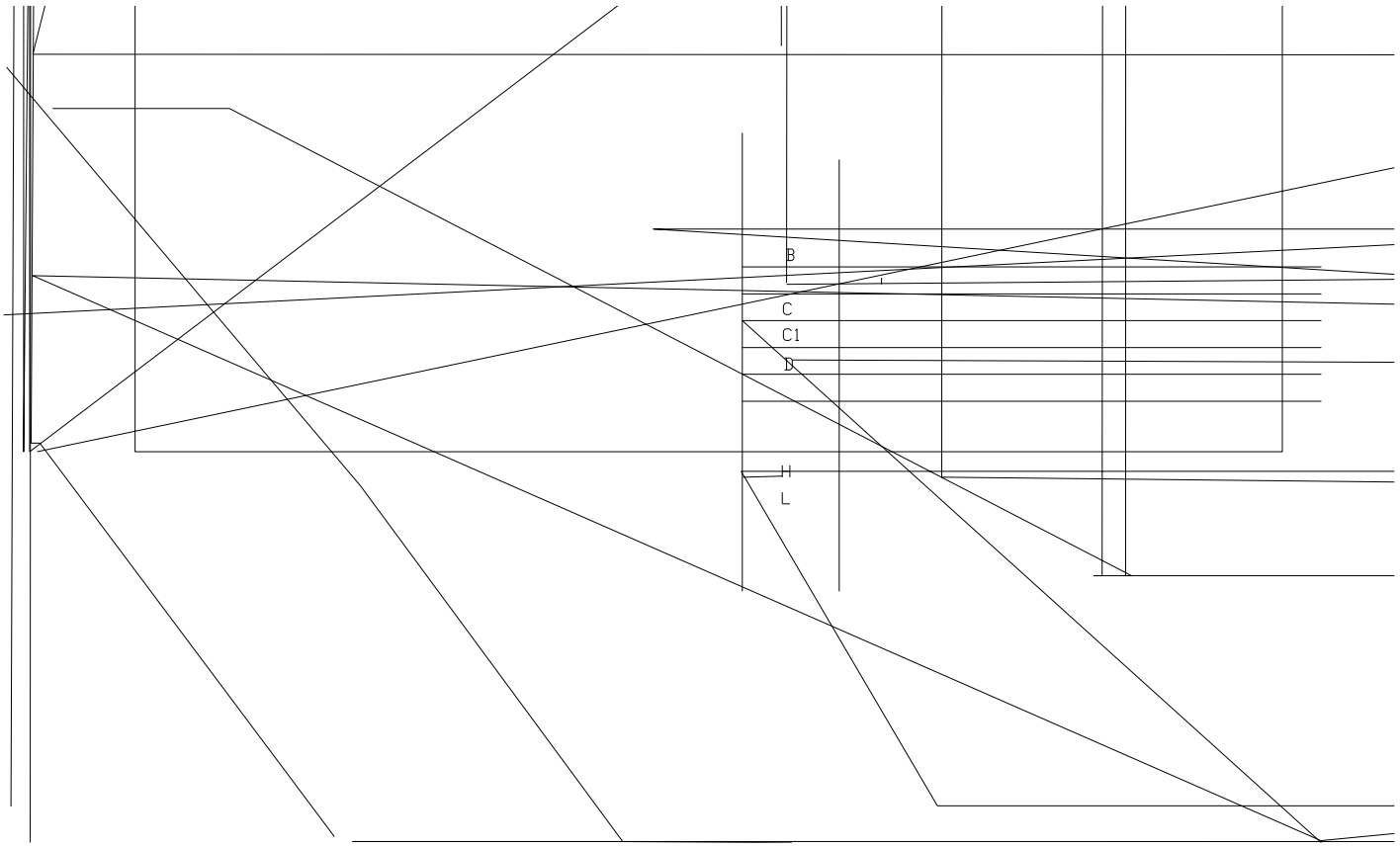


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

ITO-220AB-B Package information



Disclaimer

The information presented in this document is for reference only. Yangzhou Yangjie Electronic Technology Co., Ltd. reserves the right to make changes without notice for the specification of the products displayed herein to improve reliability, function or design or otherwise.

The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Yangjie or anyone on its behalf, assumes no responsibility or liability for any damages resulting from such improper use of sale.

This publication supersedes & replaces all information previously supplied. For additional information, please visit our website http://www.21yangjie.com D