N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
FHA50N50W

主要参数 MAIN CHARACTERISTICS

ID	50A
VDSS	500V
Rdson-typ（ @Vgs=10V）	88 mΩ
Qg-typ	148 nC

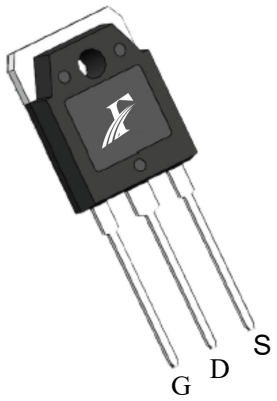
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 34 pF)	Low Crss (typical 34 pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
100%经过 RG 测试	100% Rg tested
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

用途 APPLICATIONS

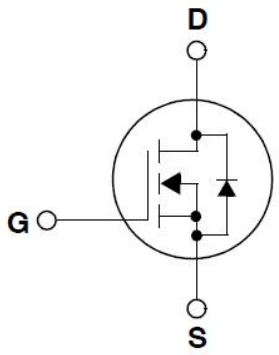
高频开关电源	High efficiency switch mode power supplies
逆变电源	Power management for inverter systems

封装形式 Package



TO-3PN
FHA series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项目 **Parameter**	符号 **Symbol**	数值 **Value**	单位 **Unit**
		FHA50N50W	
最高漏极－源极直流电压 Drain-Source Voltage	V_{DS}	500	V
连续漏极电流* Drain Current -continuous *	I_D（Tc=25℃）	50	A
	I_D（Tc=100℃)	31.6	A
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I_{DM}	200	A
最高栅源电压 Gate-Source Voltage	V_{GS}	±30	V
单脉冲雪崩能量（注 2） Single Pulsed Avalanche Energy（note 2）	E_{AS}	3380	mJ
单脉冲雪崩能量测试值（注 3） Single Pulsed Avalanche Energy Tested Value（note 3）	$E_{AS(Tested)}$	845	mJ
耗散功率 Power Dissipation	P_D （TC=25℃）	625	W
	-Derate above 25℃	5	W/℃
最高结温及存储温度 Operating and Storage Temperature Range	T_J，T_{STG}	150，–55 to 150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_L	300	℃

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS

项目 **Parameter**	符号 **Symbol**	测试条件 **Tests conditions**	最小 **Min**	典型 **Typ**	最大 **Max**	单位 **Units**
关态特性 **Off –Characteristics**						
漏－源击穿电压 Drain-Source Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	500	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25℃	-	0.5	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V,V_{GS}=0V, T_C=25℃	-	-	10	μA
		V_{DS}=400V, T_C=125℃	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I_{GSS}（F/R）	V_{DS}=0V, V_{GS} =±30V	-	-	±100	nA
通态特性 **On-Characteristics**						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , I_D=250μA	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D=25A	-	88	105	mΩ
动态特性 **Dynamic Characteristics**						
栅电阻 Gate Resistance	Rg	f=1.0MHz,V_{DS} OPEN	-	0.9	-	Ω
输入电容 Input capacitance	Ciss	V_{DS}=25V, V_{GS} =0V, f=1.0MHz	-	7950	-	pF
输出电容 Output capacitance	Coss		-	721	-	
反向传输电容 Reverse transfer capacitance	Crss		-	34	-	
开关特性 **Switching Characteristics**						
延迟时间 Turn-On delay time	td(on)	V_{DS}=250V, I_D=50A, R_G=20Ω V_{GS} =10V （note 4）	-	60	-	ns
上升时间 Turn-On rise time	tr		-	130	-	ns
延迟时间 Turn-Off delay time	td(off)		-	100	-	ns
下降时间 Turn-Off Fall time	tf		-	91	-	ns
栅极电荷总量 Total Gate Charge	Qg	V_{DS} =400V , I_D=50A , V_{GS} =10V （note 4）	-	148	-	nC
栅－源电荷 Gate-Source charge	Qgs		-	36	-	nC
栅－漏电荷 Gate-Drain charge	Qgd		-	94	-	nC
漏－源二极管特性及最大额定值 **Drain-Source Diode Characteristics and Maximum Ratings**						
正向最大连续电流 Maximum Continuous Drain -Source Diode Forward Current	I_S		-	-	50	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	200	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=50A	-	-	1.3	V
反向恢复时间 Reverse recovery time	trr	V_{GS}=0V, I_S=50A ,dI_F/dt=100A/μs (note 4)	-	500	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	8.32	-	μC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHA50N50W	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.2	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	40	℃/W

注释：
1：脉冲宽度由最高结温限制
2：L=10mH, V_{DD}=100V,I_{AS}=13A, R_G=25 Ω,起始结温 T_J=25℃
3：该值由故障样本确定，在生产中 100%测试了该值。
4：脉冲测试：脉冲宽度 ≤300μs,占空比≤2%

Notes:
1：Pulse width limited by maximum junction temperature
2：L=10mH, V_{DD}=100V,I_{AS}=13A R_G=25 Ω,Starting T_J=25℃
3：This value determined from sample failure population，100% tested to this value in production.
4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%

特性曲线
（ELECTRICAL CHARACTERISTICS (curves)）

Figure 1 Safe Operating Area

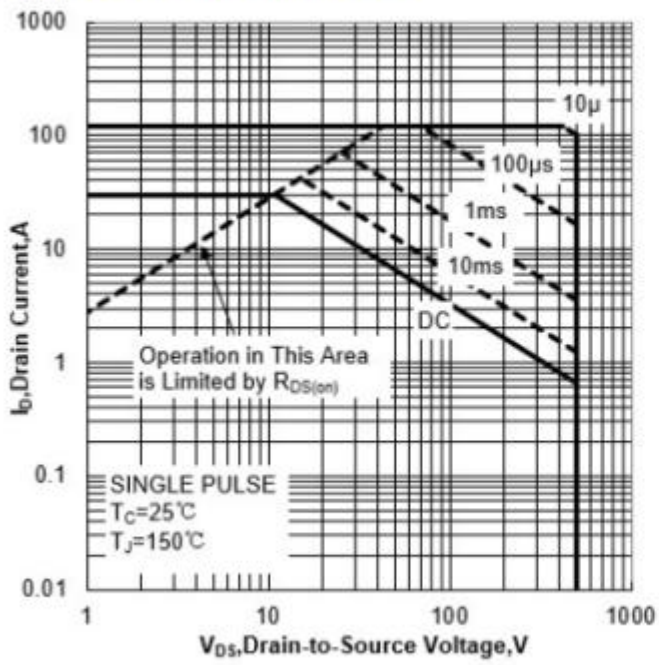


Figure 2 Power Dissipation

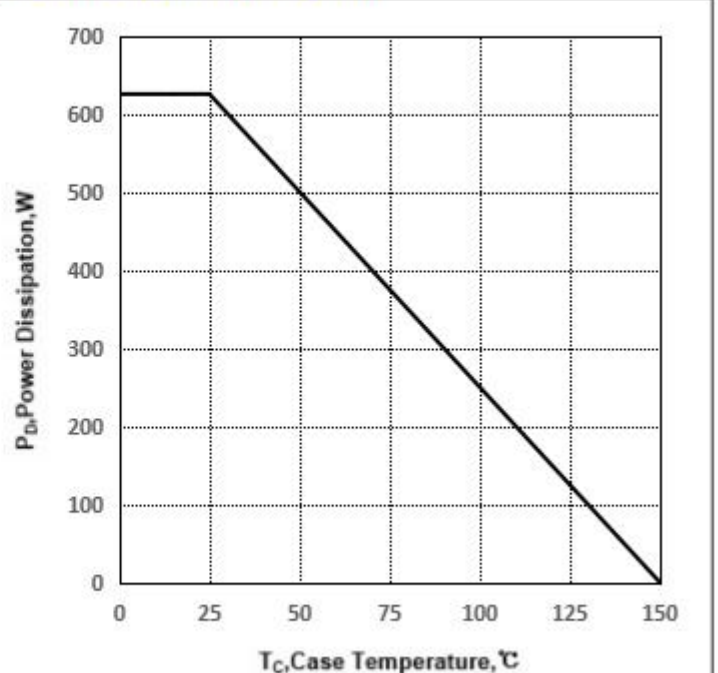


Figure 3 Max Thermal Impendance

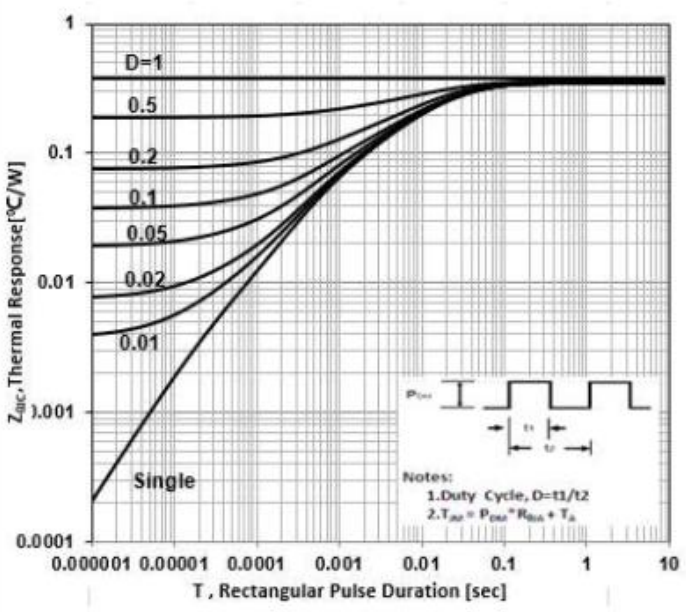


Figure 4 Typical Output Characteristics

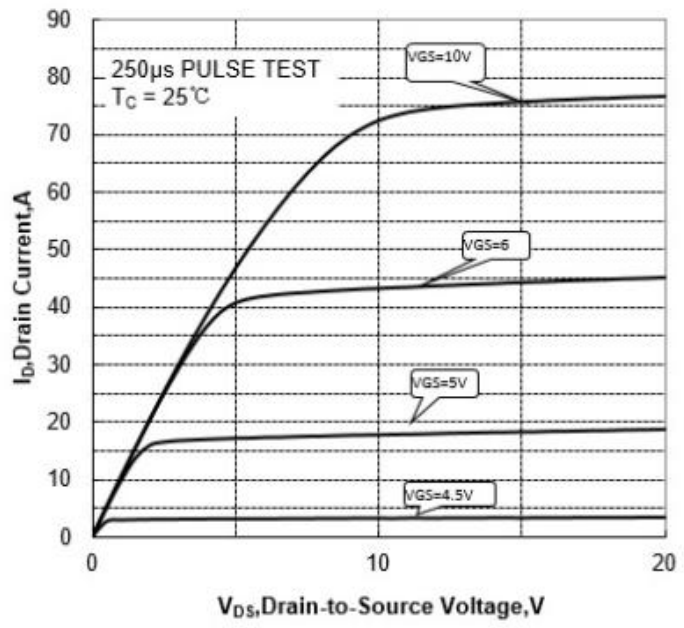


Figure 5 Typical Transfer Characteristics

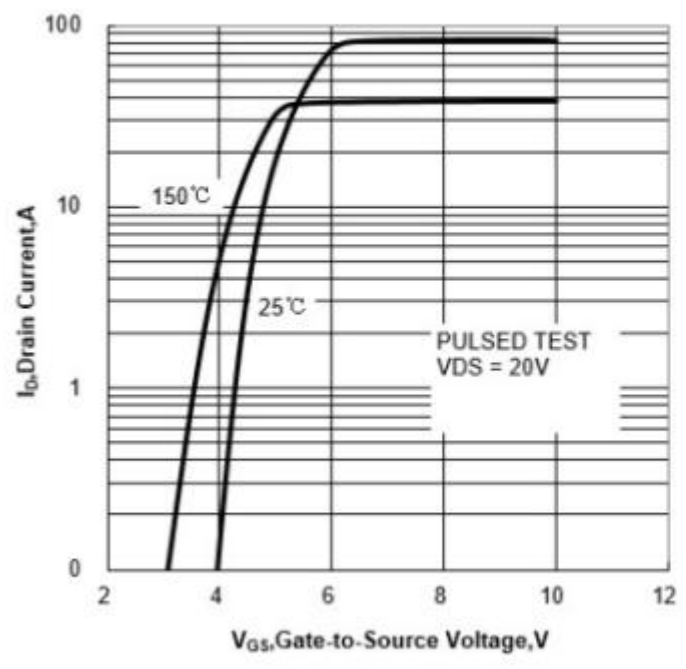


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

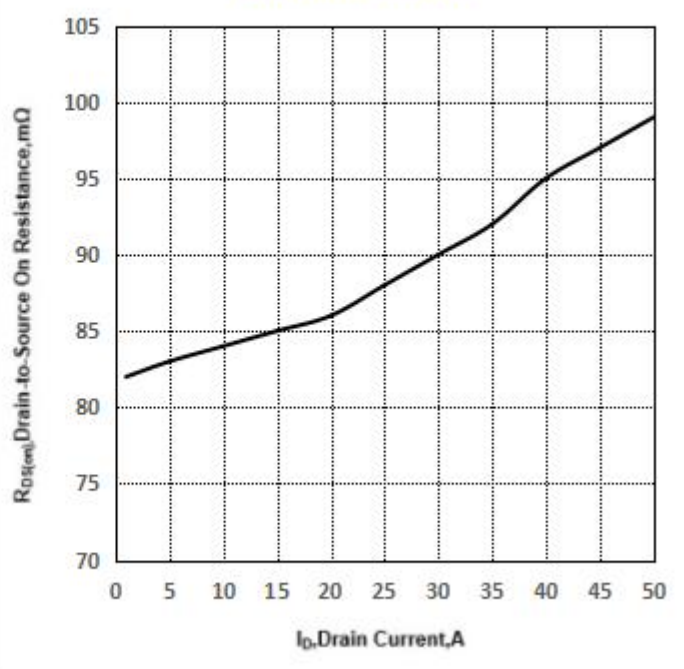


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

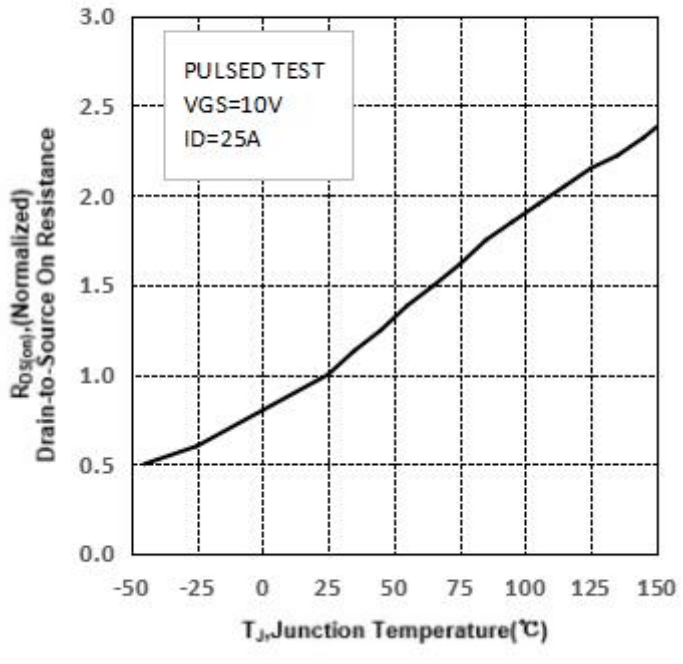


Figure 8 Typical Theshold Voltage vs Junction Temperature

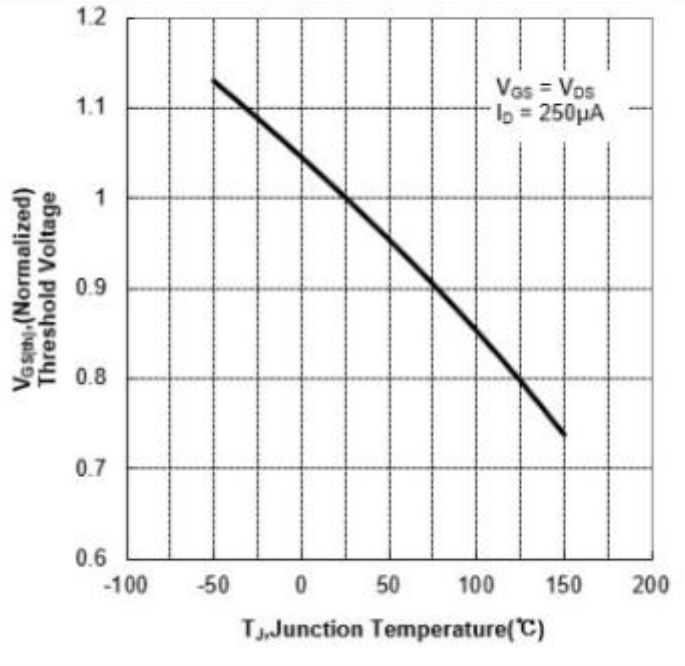


Figure 9 Typical Breakdown Voltage vs Junction Temperature

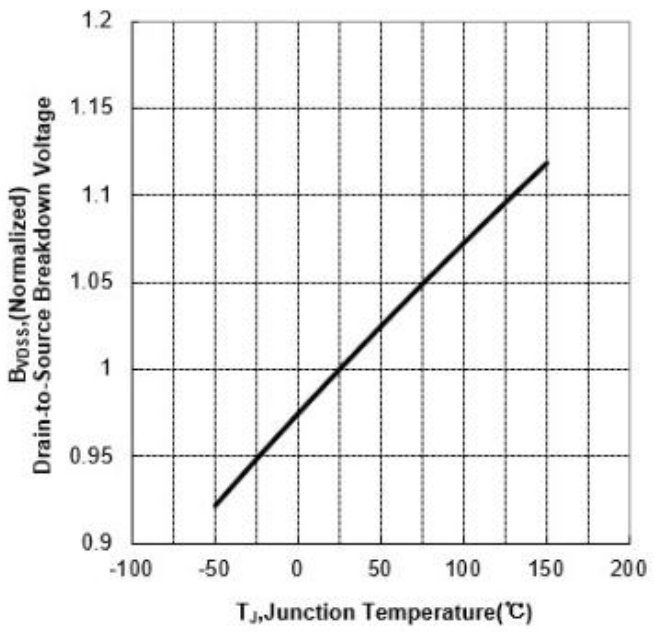


Figure 10 Typical Theshold Voltage vs Junction Temperature

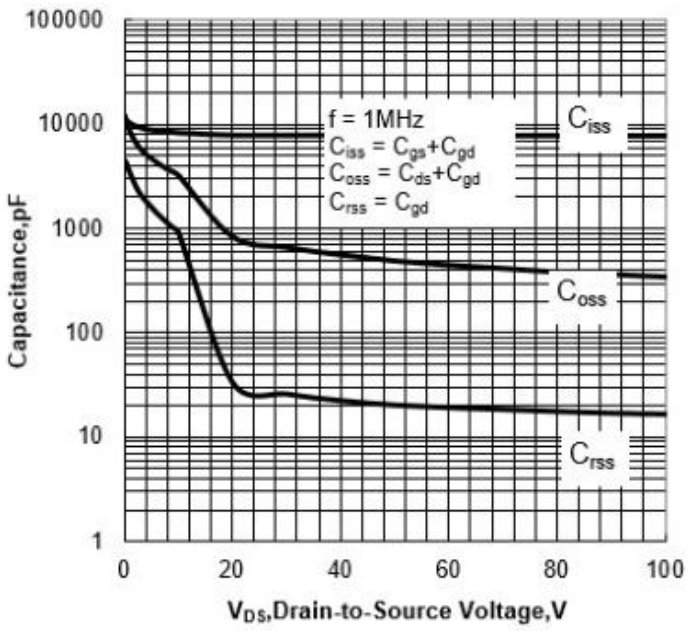
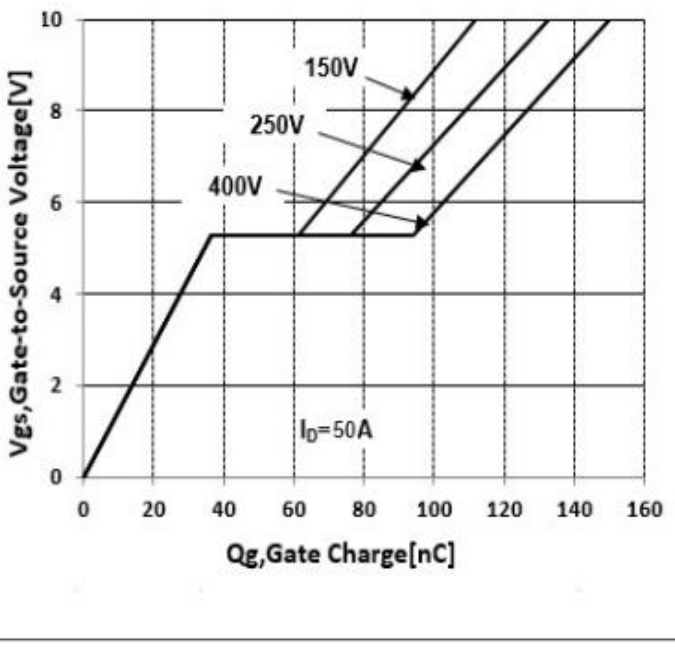


Figure 11 Typical Breakdown Voltage vs Junction Temperature



Test Circuit & Waveform

Figure 12 Gate Charge Test Circuit

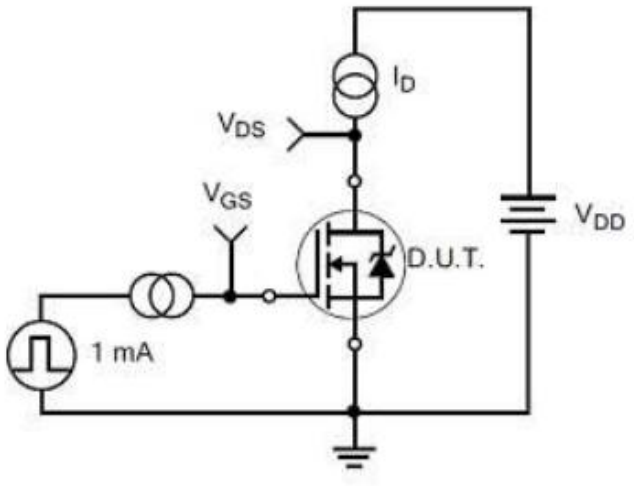


Figure 13 Gate Charge Waveforms

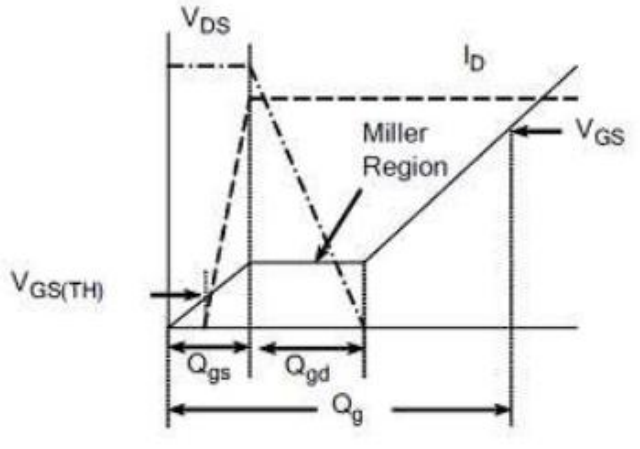


Figure 14 Resistive Switching Test Circuit

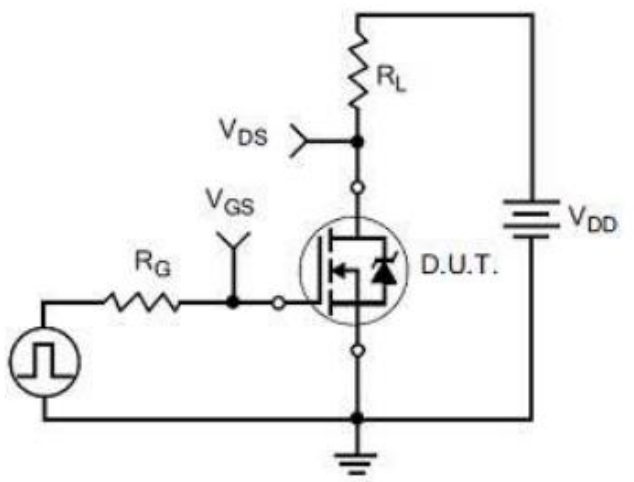


Figure 15 Resistive Switching Waveforms

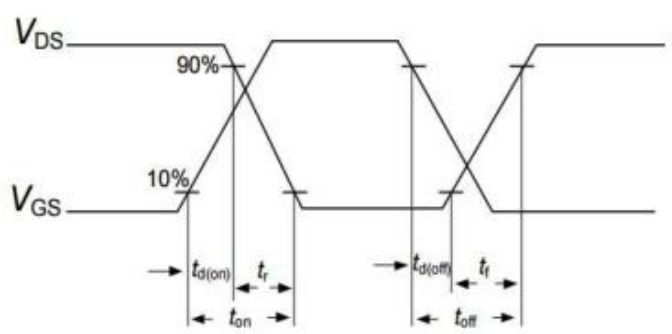


Figure 16 Diode Reverse Recovery Test Circuit

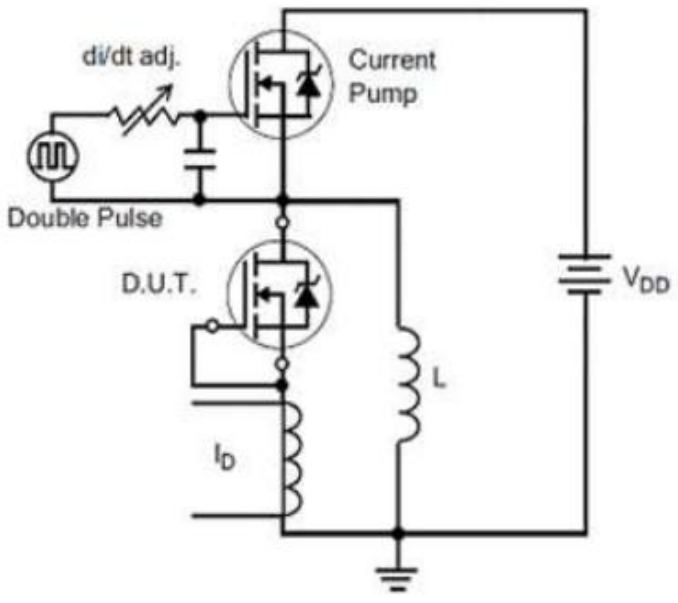


Figure 17 Diode Reverse Recovery Waveform

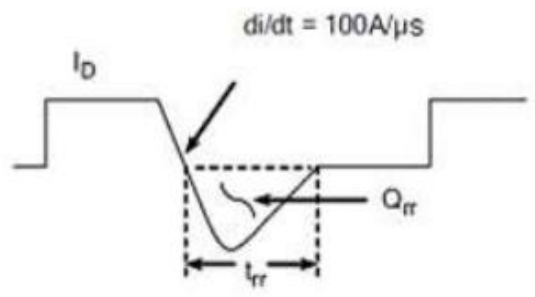


Figure 18 Unclamped Inductive Switching Test Circuit

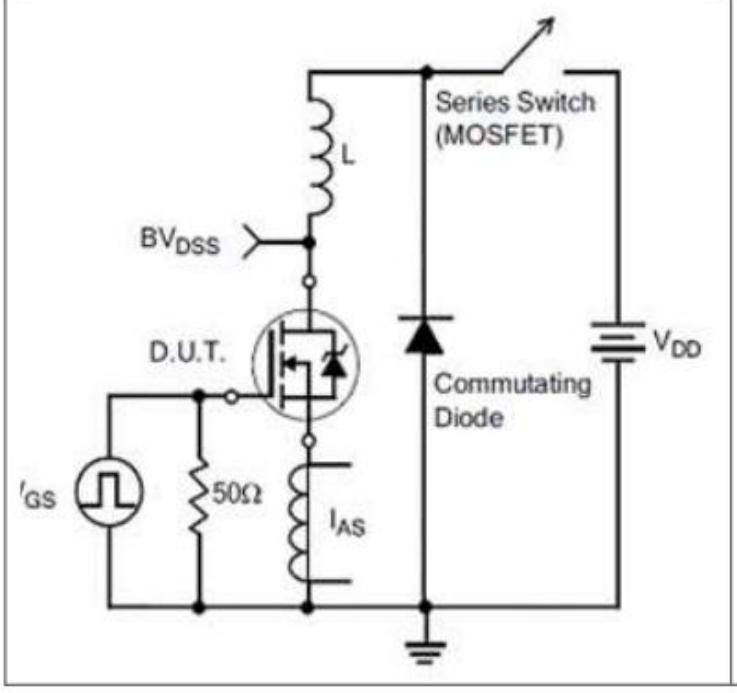
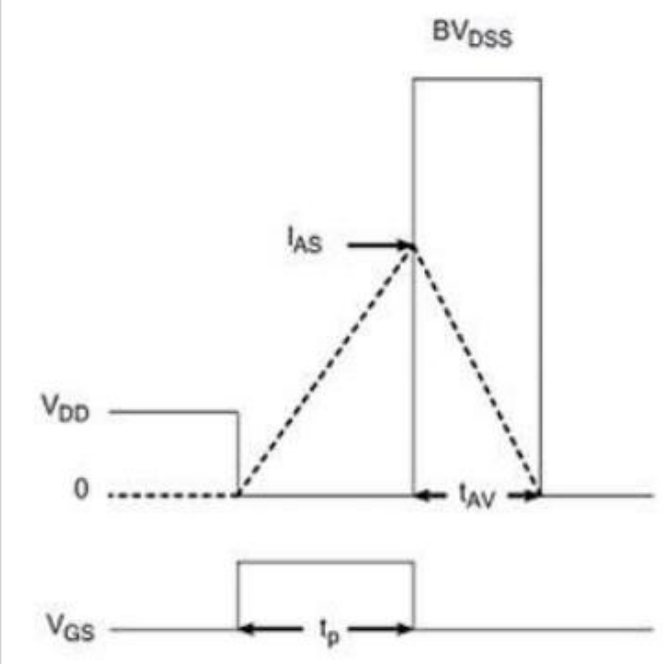
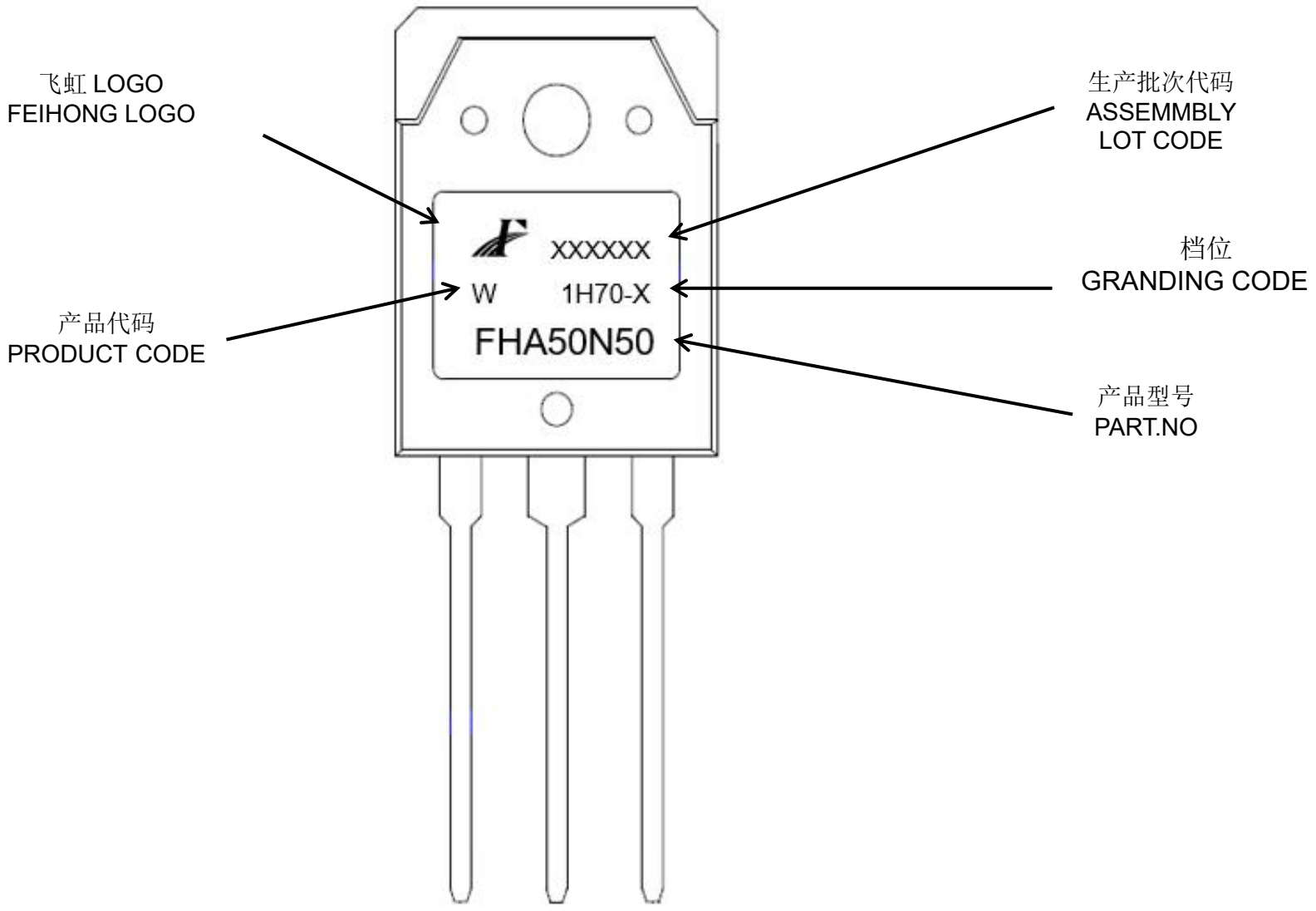


Figure 19 Unclamped Inductive Switching Waveform



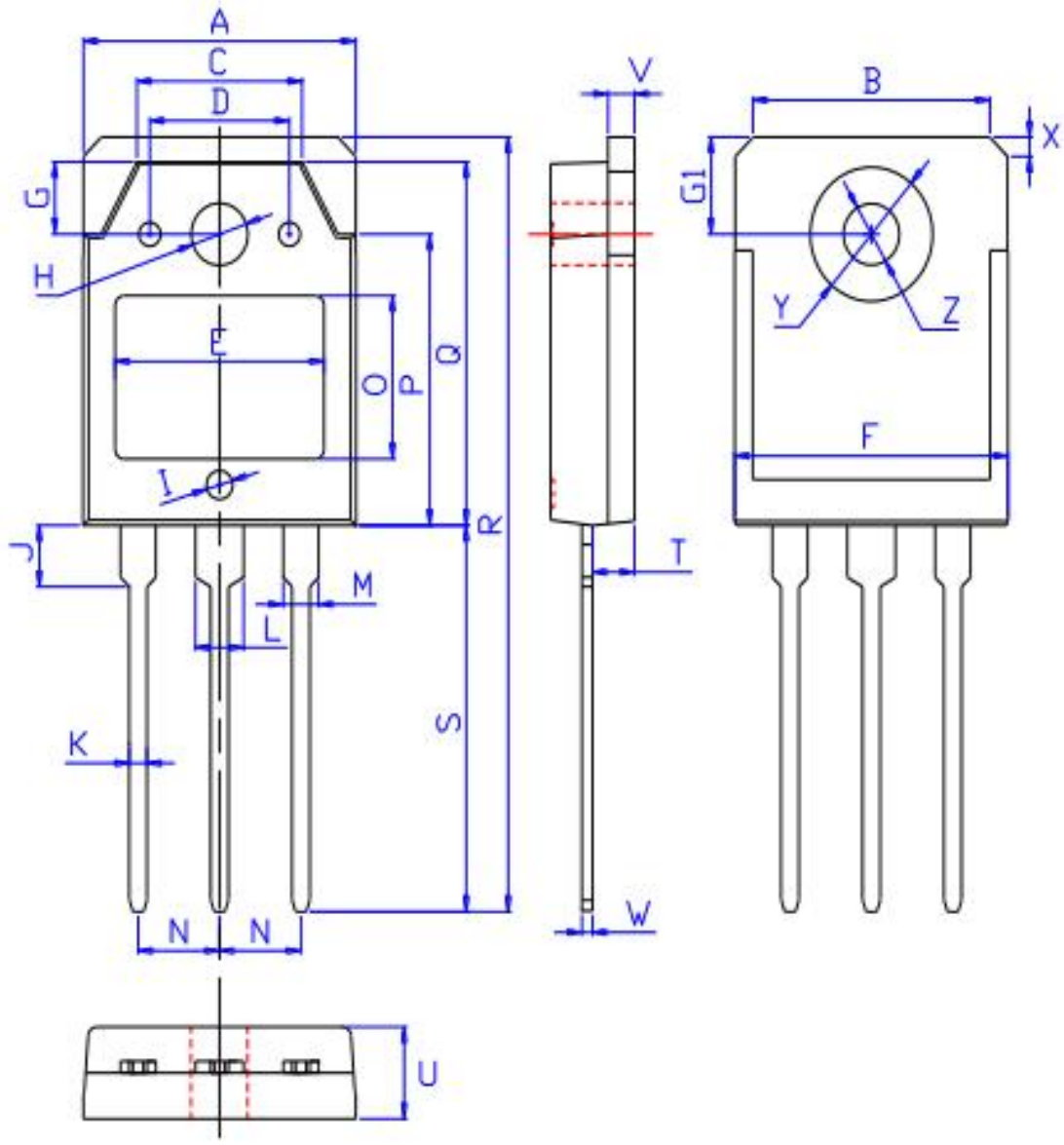
印记 Marking:


飞虹 LOGO
FEIHONG LOGO
XXXXXX
W 1H70-X
FHA50N50
产品代码
PRODUCT CODE
生产批次代码
ASSEMMBLY
LOT CODE
档位
GRANDING CODE
产品型号
PART.NO

外形尺寸：

Package Dimension：

TO-3PN



DIM	MILLIMETERS
A	15.60±0.30
B	13.60±0.30
C	9.50±0.30
D	8.00±0.30
E	11.85±0.30
F	15.65±0.30
G	3.80±0.30
G1	5.00±0.30
H	Φ3.50±0.30
I	Φ1.50±0.30 深 0.15±0.15
J	3.20±0.30
K	1.00±0.15
L	3.10±0.15
M	2.10±0.15
N	5.45±0.30
O	8.40±0.30
P	13.90±0.30
Q	18.70±0.30
R	40.00±0.60
S	20.00±0.40
T	2.40±0.30
U	4.80±0.30
V	1.50±0.15
W	0.60±0.15
X	1.80±0.40
Y	7.00±0.30
Z	3.20±0.30

（Units：mm）