N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
FHK94N50A

主要参数 MAIN CHARACTERISTICS

ID	94 A
VDSS	500 V
Rdson-typ（ @Vgs=10V）	47 mΩ
Qg-typ	225 nC

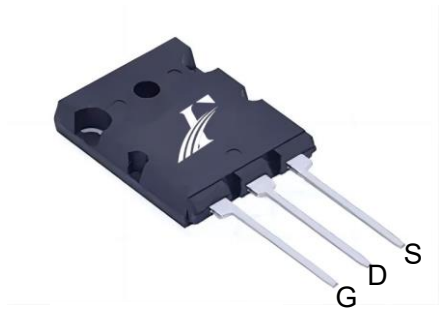
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 58 pF)	Low Crss (typical 58 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
内置 FRD	Built-in fast recovery diode
符合 RoHS 标准	ROHS compliant

用途 APPLICATIONS

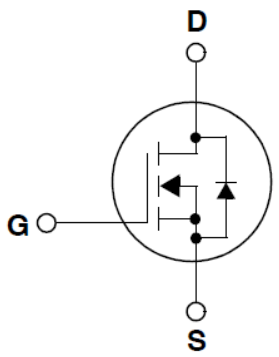
音响功放	Audio power amplifier

封装形式 Package



TO-264
FHK 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**
		FHK94N50A	
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（T_C=25℃）	94	A
	I_D（T_C=100℃)	65	A
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I_{DM}	376	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}	6125	mJ
雪崩电流（注 1） Avalanche Current（note 1）	I_{AS}	35	A
二极管反向恢复最大电压变化速率（注 3） Peak Diode Recovery dv/dt（note 3）	dv/dt	30	V/ns
耗散功率 Power Dissipation	P_D （TC=25℃）	1300	W
	-Derate above 25℃	10.4	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	$\Delta BV_{DSS}/\Delta$ TJ	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℃	-	-	1000	μA
栅极体漏电流 Gate-body leakage current	I_{GSS}（F/R）	V_{DS}=0V, V_{GS} =±30V	-	-	±200	nA
通态特性 **On-Characteristics**						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , I_D=250μA	3.0	4.2	5.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D=30A	-	47	65	mΩ
动态特性 **Dynamic Characteristics**						
输入电容 Input capacitance	Ciss	V_{DS}=25V, V_{GS} =0V, f=1.0MHz	-	13420	-	pF
输出电容 Output capacitance	Coss		-	1250	-	
反向传输电容 Reverse transfer capacitance	Crss		-	58	-	
开关特性 **Switching Characteristics**						
延迟时间 Turn-On delay time	td(on)	V_{DS}=250V, I_D=47A, R_G=1Ω V_{GS} =10V （note 4，5）	-	36	-	ns
上升时间 Turn-On rise time	tr		-	15	-	ns
延迟时间 Turn-Off delay time	td(off)		-	75	-	ns
下降时间 Turn-Off Fall time	tf		-	15	-	ns
栅极电荷总量 Total Gate Charge	Qg	V_{DS} =250V , I_D=47A , V_{GS} =10V （note 4，5）	-	225	-	nC
栅－源电荷 Gate-Source charge	Qgs		-	65	-	nC
栅－漏电荷 Gate-Drain charge	Qgd		-	58	-	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		-	-	94	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	376	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=94A	-	-	1.5	V
反向恢复时间 Reverse recovery time	trr	V_{GS}=0V, I_S=47A ,dI_F/dt=100A/μs (note 4)	-	135	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	1.3	-	μC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHK94N50A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.096	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	30	℃/W

注释：
1：脉冲宽度由最高结温限制
2：L=10mH, IAS=35A, VDD=50V, RG=25 Ω,起始结温 TJ=25℃
3：ISD ≤94A,di/dt ≤200A/μs,VDD≤BVDSS,起始结温 TJ=25℃
4：脉冲测试：脉冲宽度 ≤300μs,占空比≤2％
5：基本与工作温度无关

Notes:
1：Pulse width limited by maximum junction temperature
2： L=10mH, IAS=35A, VDD=50V, RG=25 Ω ,Start TJ=25℃;
3：ISD ≤94A,di/dt ≤200A/μs,VDD≤BVDSS, Starting TJ=25℃
4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2％
5：Essentially independent of operating temperature

特性曲线
（ELECTRICAL CHARACTERISTICS (curves)）

Fig. 1. Output Characteristics @ T_J = 25ºC

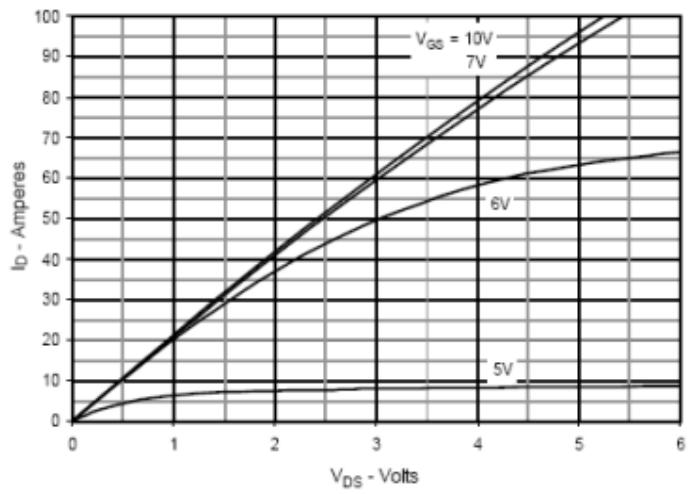


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

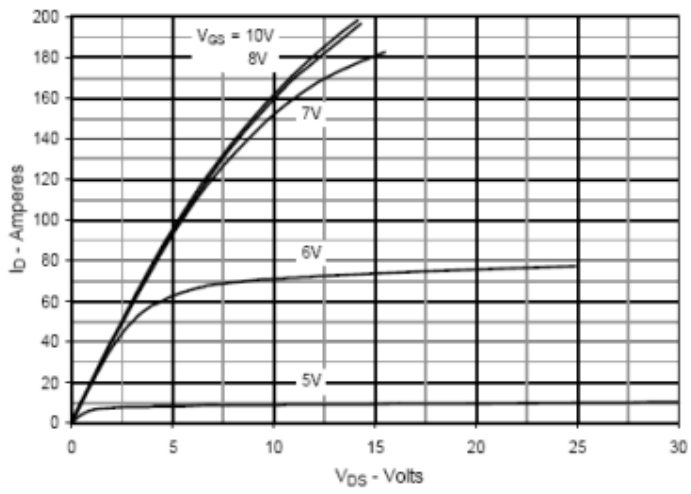


Fig. 3. Output Characteristics @ T_J = 125ºC

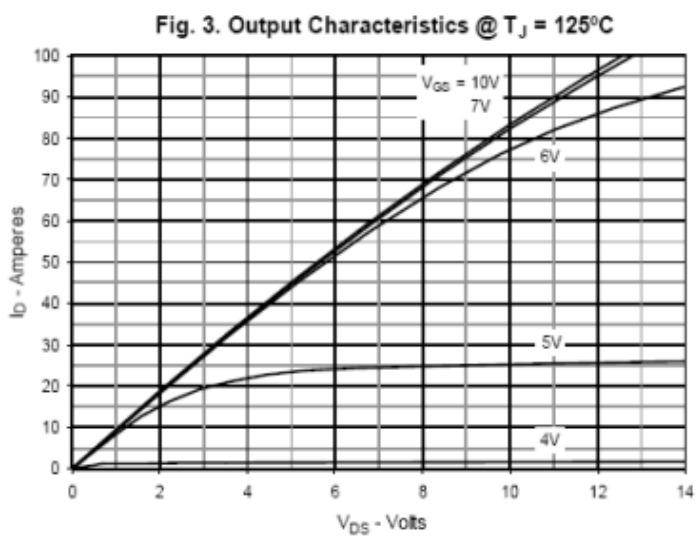


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 47A Value vs. Junction Temperature

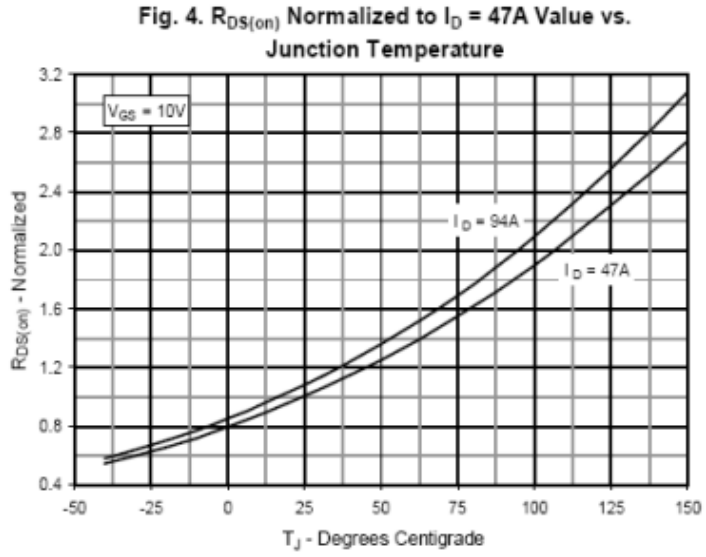


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 47A Value vs. Drain Current

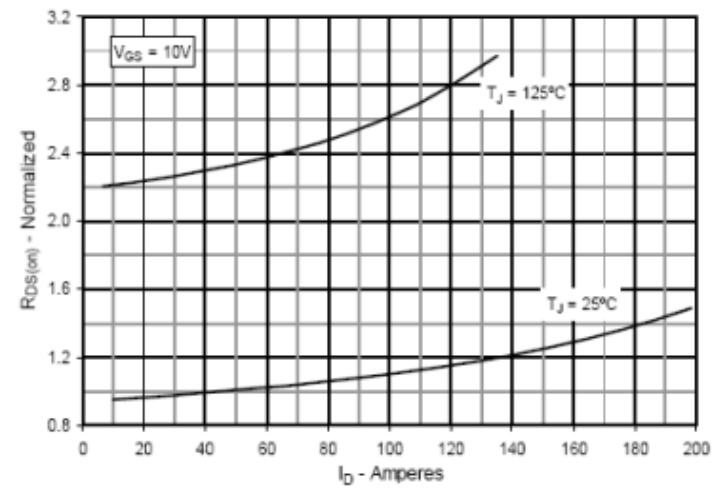


Fig. 6. Maximum Drain Current vs. Case Temperature

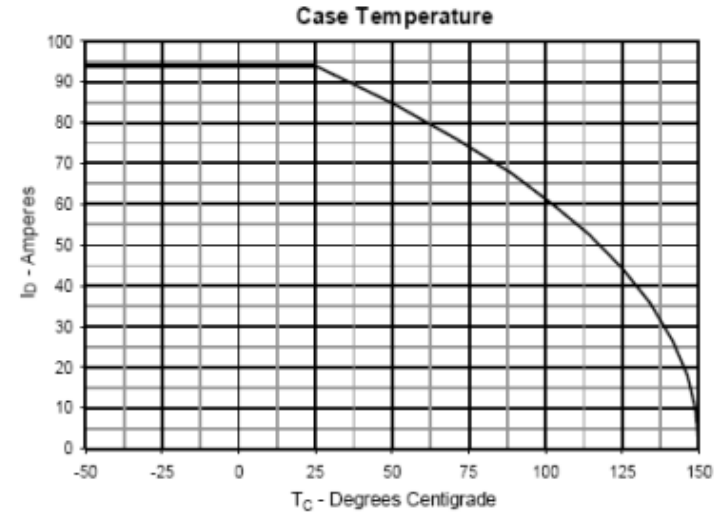


Fig. 7. Input Admittance

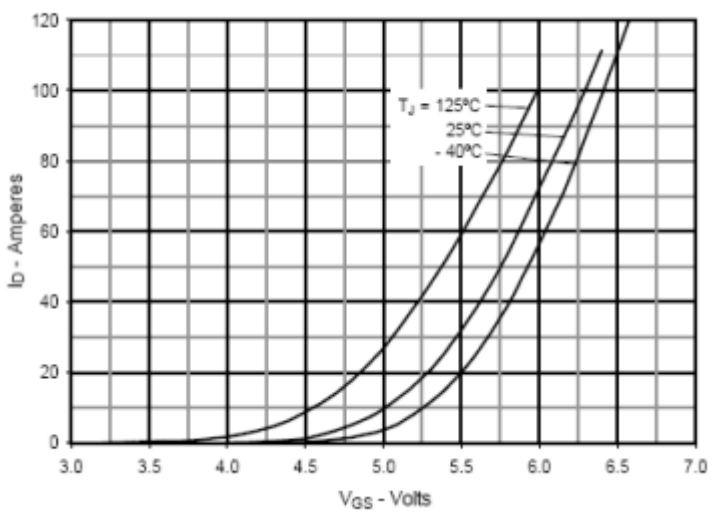


Fig. 8. Transconductance

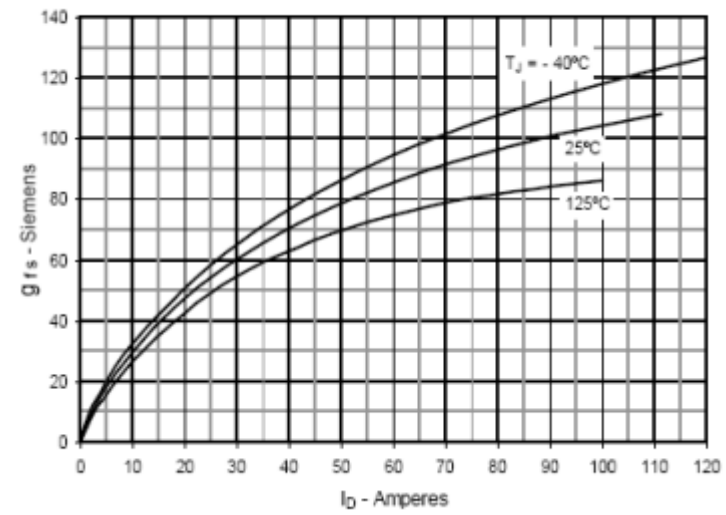


Fig. 9. Forward Voltage Drop of Intrinsic Diode

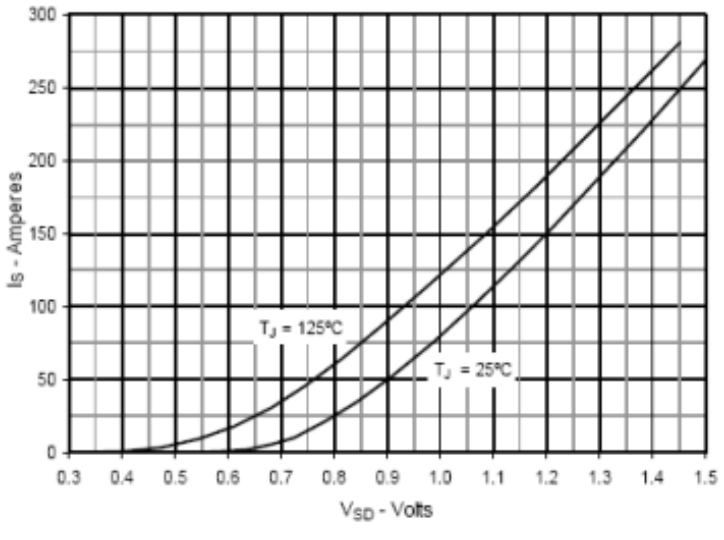


Fig. 10. Gate Charge

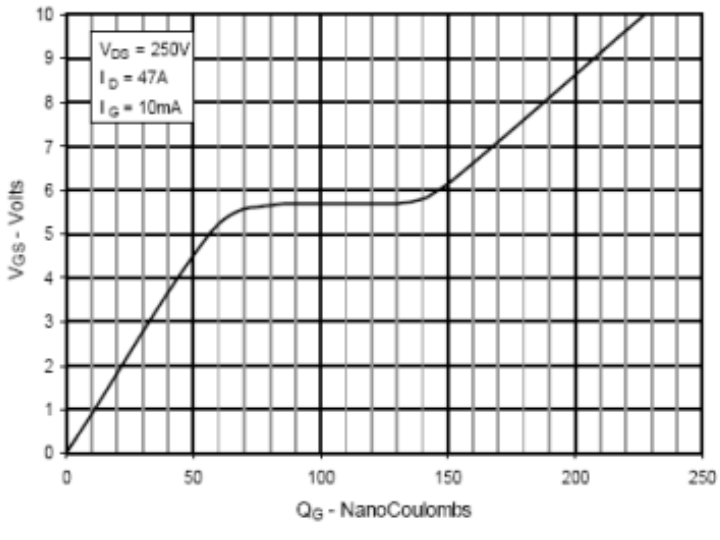


Fig. 11. Capacitance

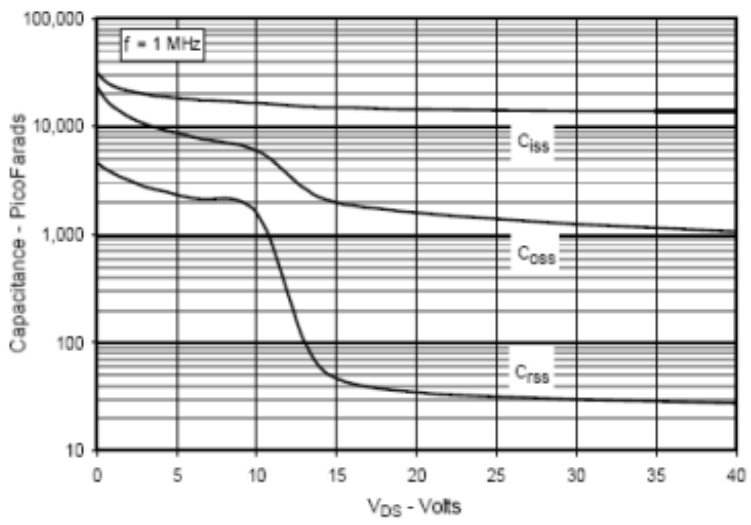


Fig. 12. Forward-Bias Safe Operating Area

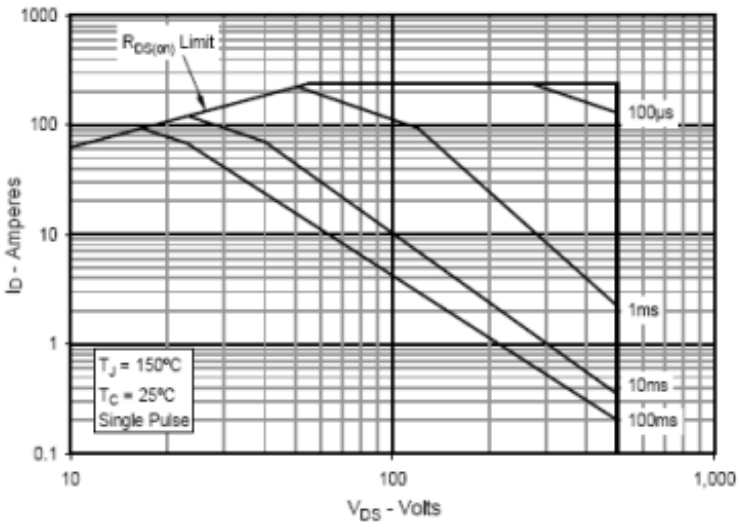
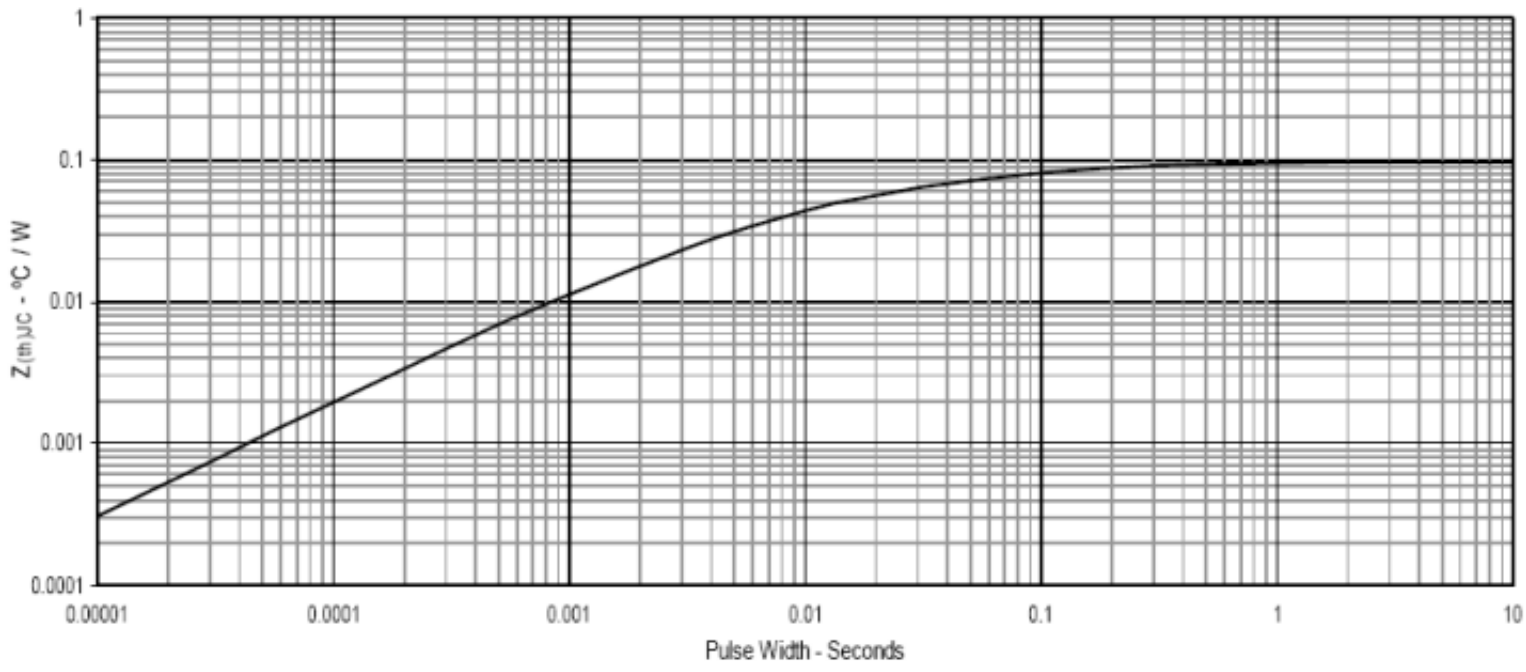
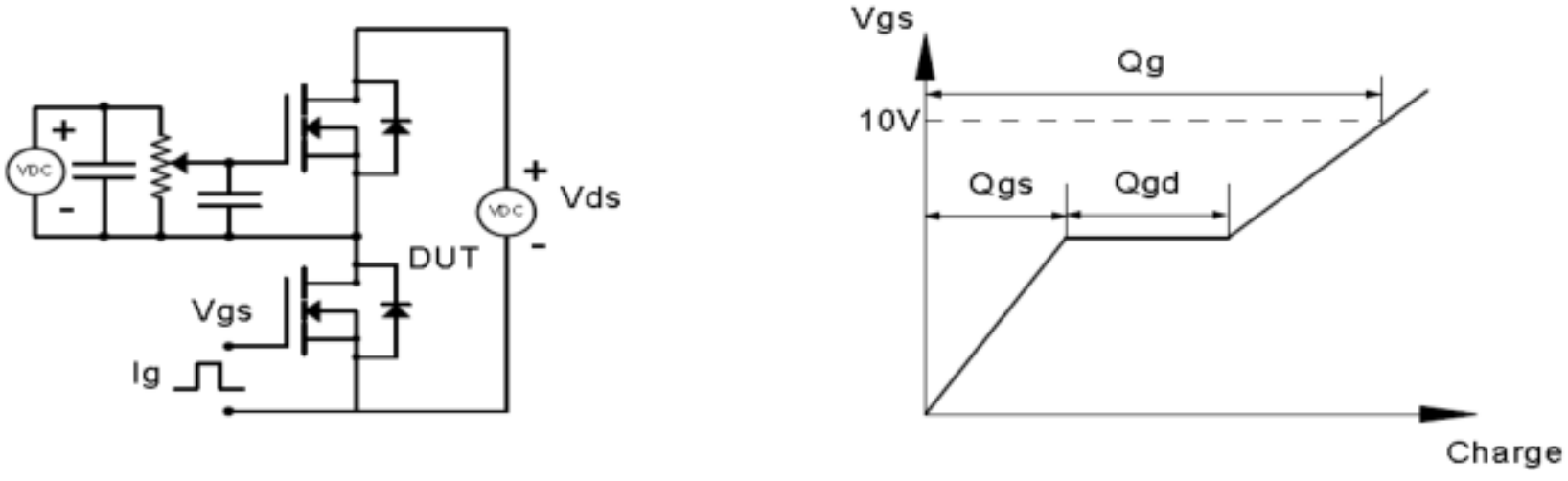


Fig. 13. Maximum Transient Thermal Impedance

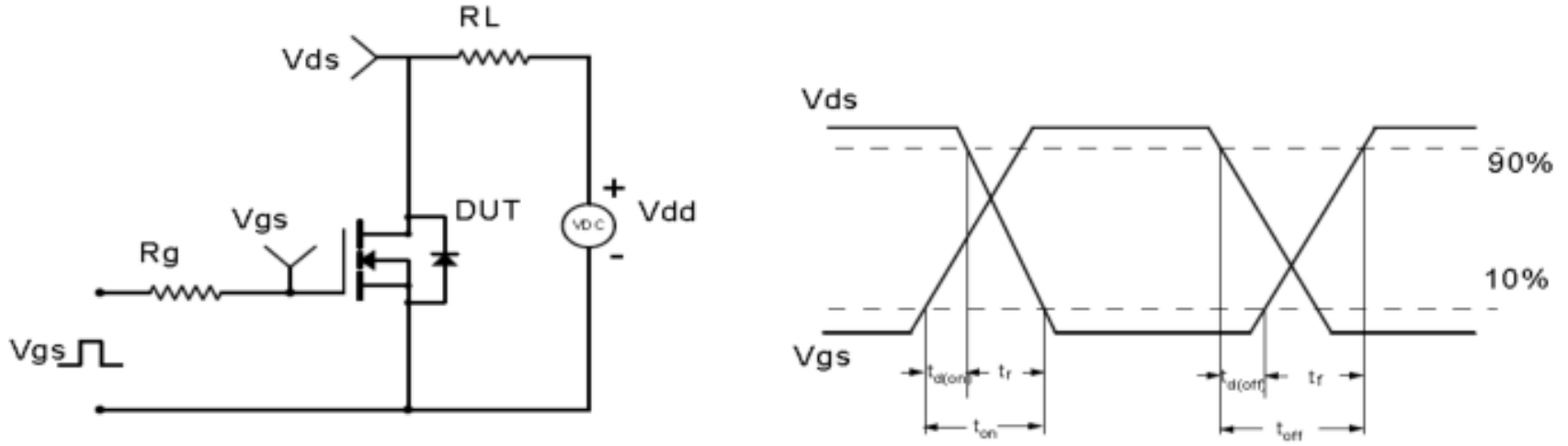


Test Circuit & Waveform

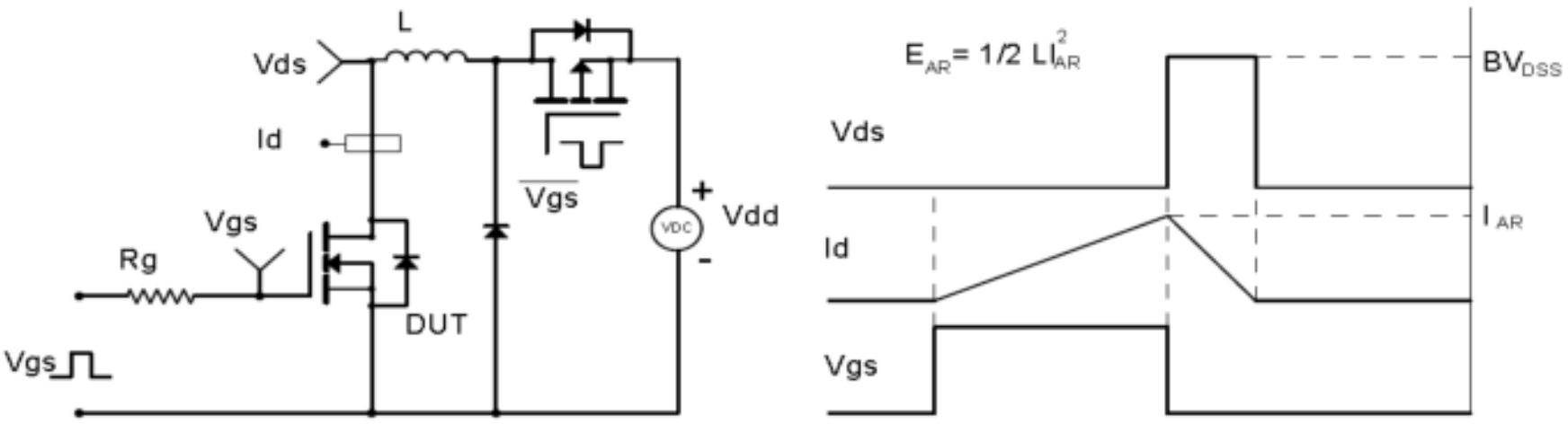
Gate Charge Test Circuit & Waveform



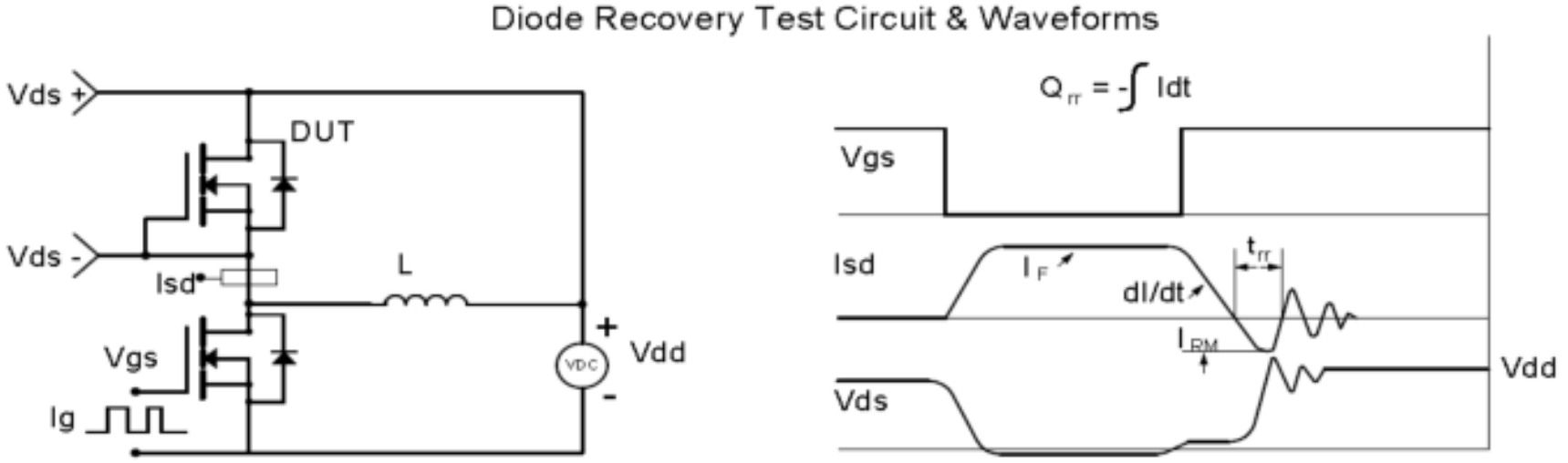
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



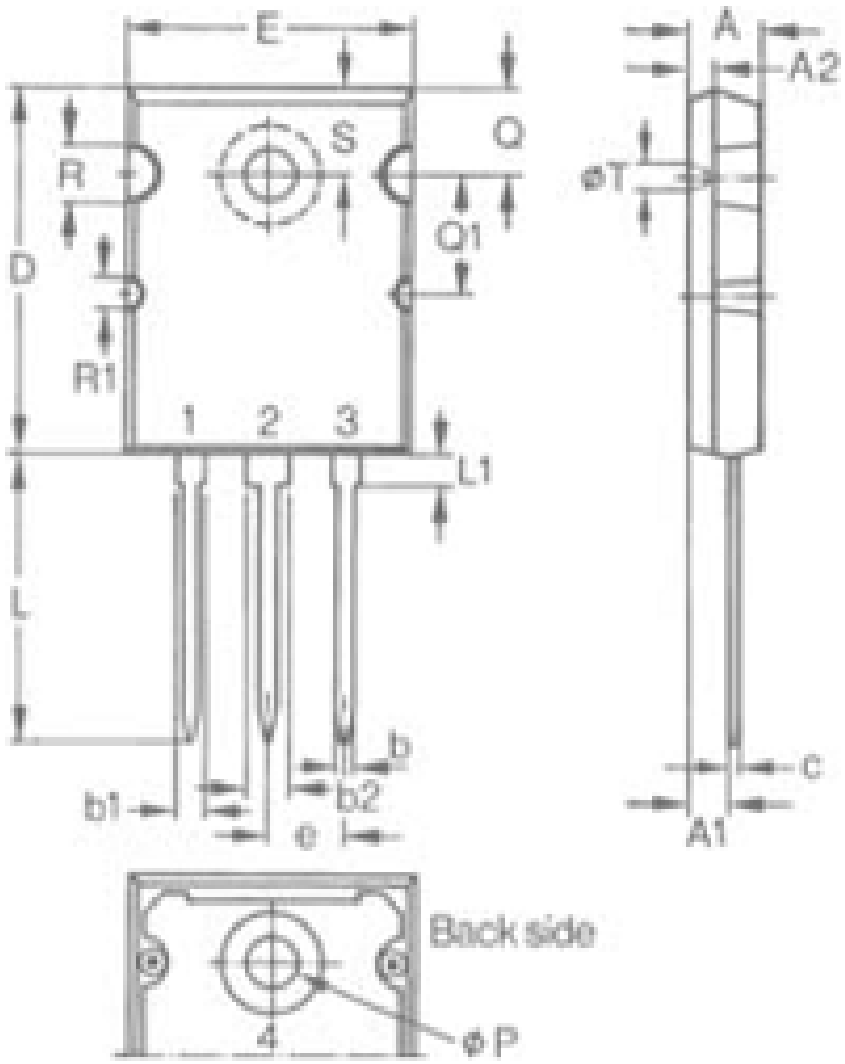
Diode Recovery Test Circuit & Waveforms



外形尺寸：

Package Dimension：

TO-264



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

Terminals: 1 - Gate
2 - Drain
3 - Source
4 - Drain

（Units：mm）