



N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
FHD50N06LC

主要参数 MAIN CHARACTERISTICS

ID	50 A
VDSS	60 V
Rdson-typ (@Vgs=10V)	12.8 mΩ
Rdson-typ (@Vgs=4.5V)	13.5 mΩ
Qg-typ	50 nC

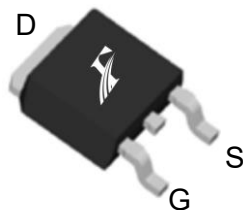
用途 APPLICATIONS

开关电源应用	Power switching application
开关和高频电路	Hard switched and high frequency circuits

产品特性 FEATURES

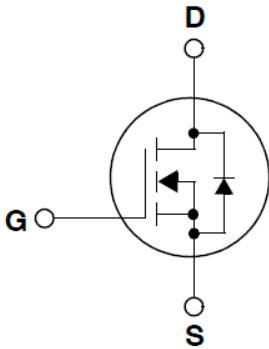
低栅极电荷	Low gate charge
低 Crss (典型值 120 pF)	Low Crss (typical 120 pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
100%经过 Rg 测试	100% Rg tested
沟槽工艺	Trench technology
符合 RoHS 标准	ROHS compliant

封装形式 Package



TO-252
FHD 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
		FHD50N06LC	
最高漏极—源极直流电压 Drain-Source Voltage	VDS	60	V
连续漏极电流* Drain Current -continuous *	Id (Tc=25℃)	50	A
	Id (Tc=100℃)	35	A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	IDM	200	A
最高栅源电压 Gate-Source Voltage	VGS	±20	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	EAS	32	mJ
雪崩电流 (注 1) Avalanche Current (note 1)	IAS	8	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	5.0	V/ns
耗散功率 Power Dissipation	PD (TC=25℃)	85	W
	-Derate above 25℃	0.57	W/℃
最高结温及存储温度 Operating and Storage Temperature Range	TJ, TSTG	175,-55~+175	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	TL	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	60	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /Δ T _J	I _D =250μA, referenced to 25℃	-	0.06	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V,V _{GS} =0V, T _C =25℃	-	-	1.0	μA
		V _{DS} =48V,V _{GS} =0V, T _C =125℃	-	-	250	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±30V	-	-	±1	μA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.0	1.3	2.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =25A	-	12.8	14	mΩ
		V _{GS} =4.5V , I _D =15A	-	13.5	18	mΩ
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz,V _{DS} =OPEN	-	4.7	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1.0MHz	-	2050	-	pF
输出电容 Output capacitance	C _{oss}		-	158	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	120	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =30V, I _D =25A, R _G =3Ω V _{GS} =10V (note 4, 5)	-	7.5	-	ns
上升时间 Turn-On rise time	t _r		-	5.0	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	28	-	ns
下降时间 Turn-Off Fall time	t _f		-	5.5	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =30V , I _D =25A , V _{GS} =10V (note 4, 5)	-	50	-	nC
栅－源电荷 Gate-Source charge	Q _{gs}		-	6	-	nC
栅－漏电荷 Gate-Drain charge	Q _{gd}		-	15	-	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 _S =50A	-	-	1.3	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =25A ,dI _F /dt=100A/μs (note 4)	-	30	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	40	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHD50N06LC	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	1.76	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	125	℃/W

- 注释:
- 1: 脉冲宽度由最高结温限制
 - 2: L=1mH, IAS=8A, VDD=50V, RG=25 Ω,起始结温 TJ=25℃
 - 3: ISD ≤50A,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=1mH, IAS=8A, VDD=50V, RG=25 Ω,Starting TJ=25℃
 - 3: ISD ≤50A,di/dt ≤200A/μs,VDD≤BVDSS, Starting TJ=25℃
 - 4: Pulse Test: Pulse Width ≤300μs,Duty Cycle≤2%
 - 5: Essentially independent of operating temperature

Typical Characteristics

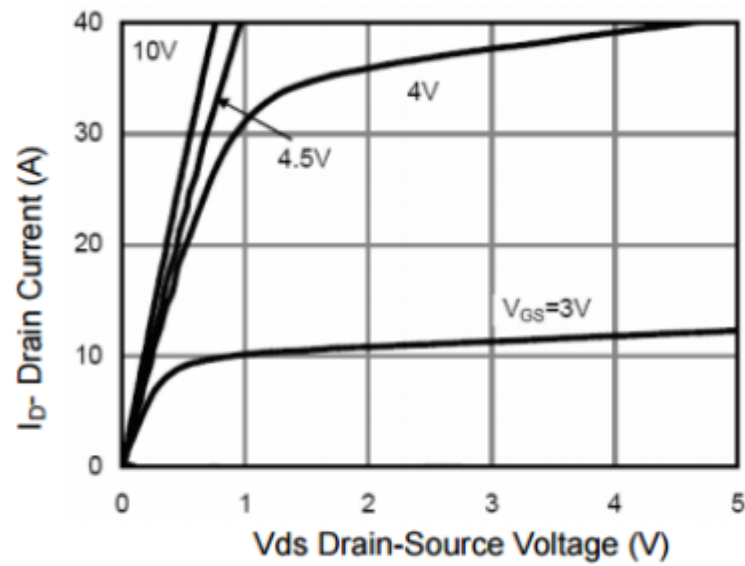


Figure 1 Output Characteristics

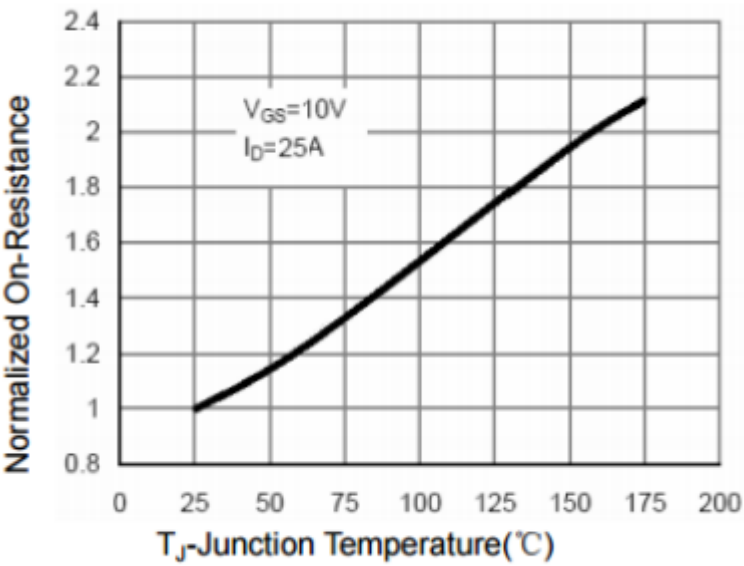


Figure 4 Rdson-Junction Temperature

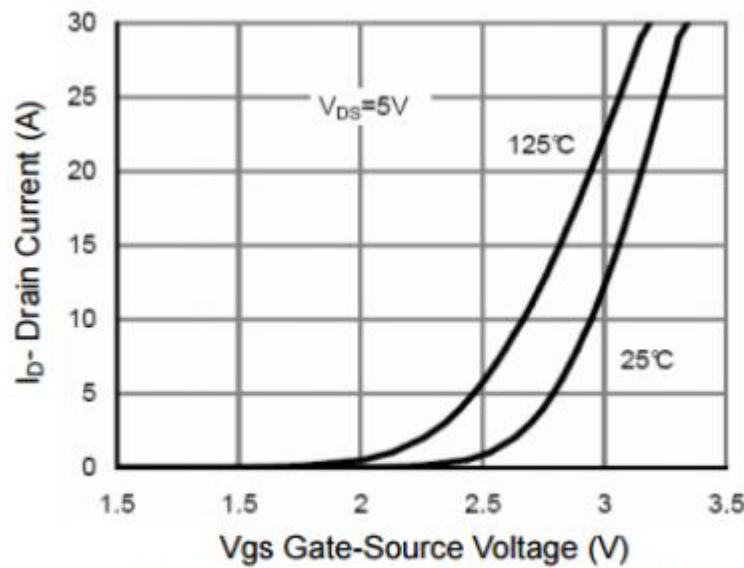


Figure 2 Transfer Characteristics

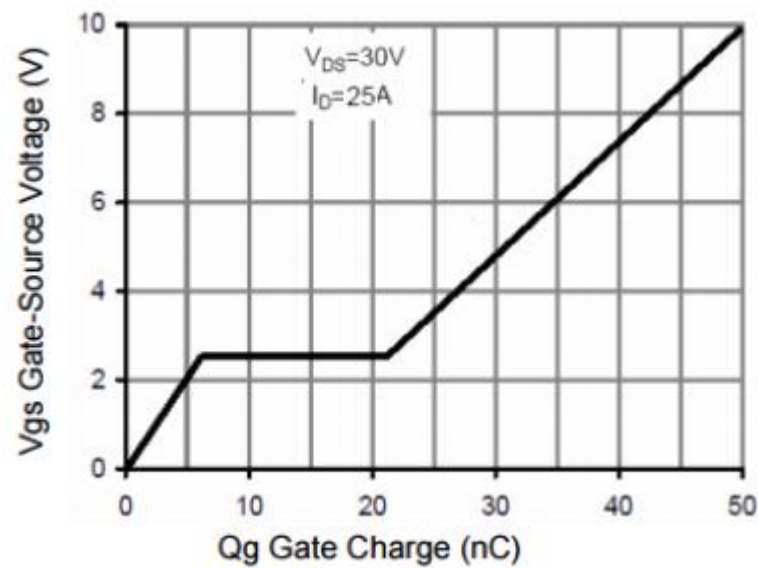


Figure 5 Gate Charge

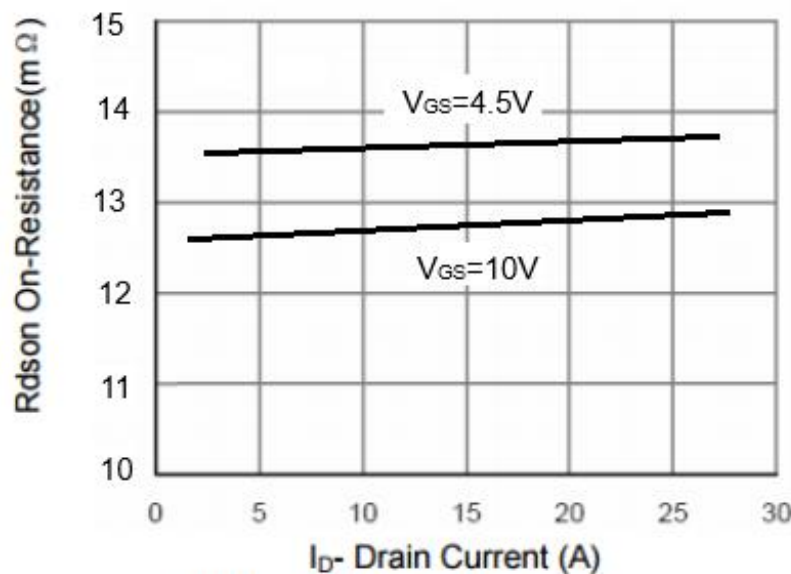


Figure 3 Rdson- Drain Current

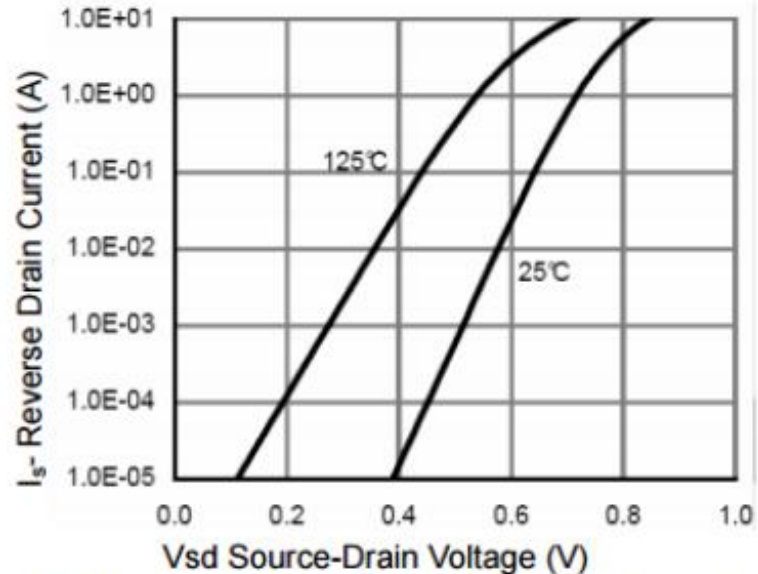


Figure 6 Source- Drain Diode Forward

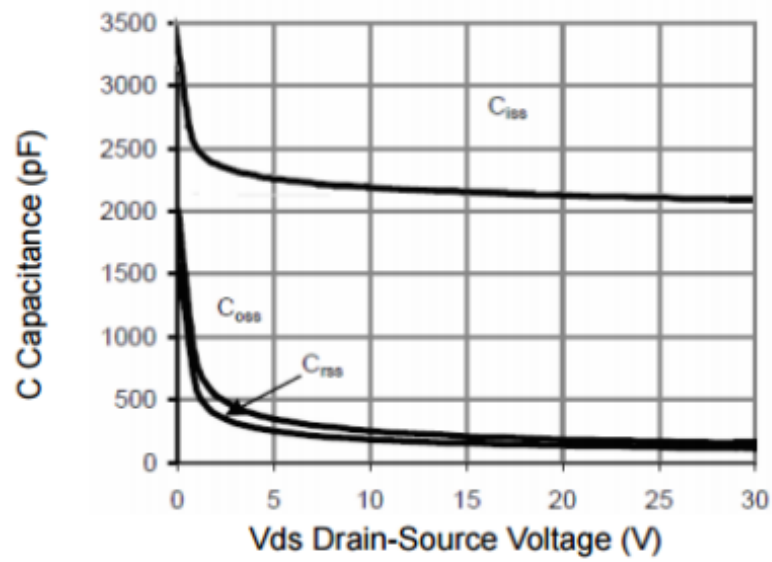


Figure 7 Capacitance vs Vds

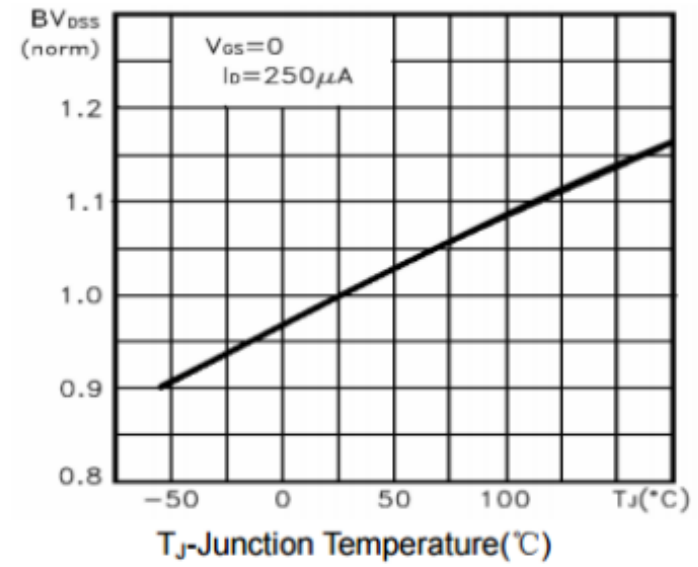


Figure 9 BV_{DSS} vs Junction Temperature

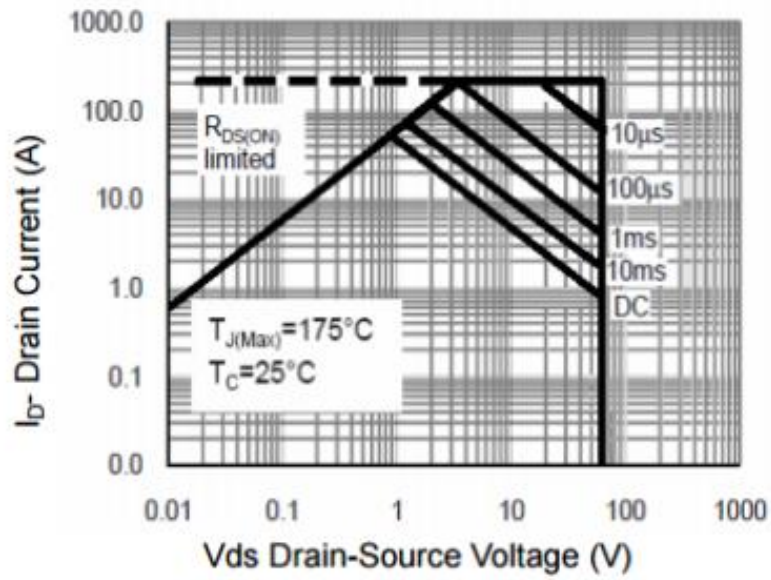


Figure 8 Safe Operation Area

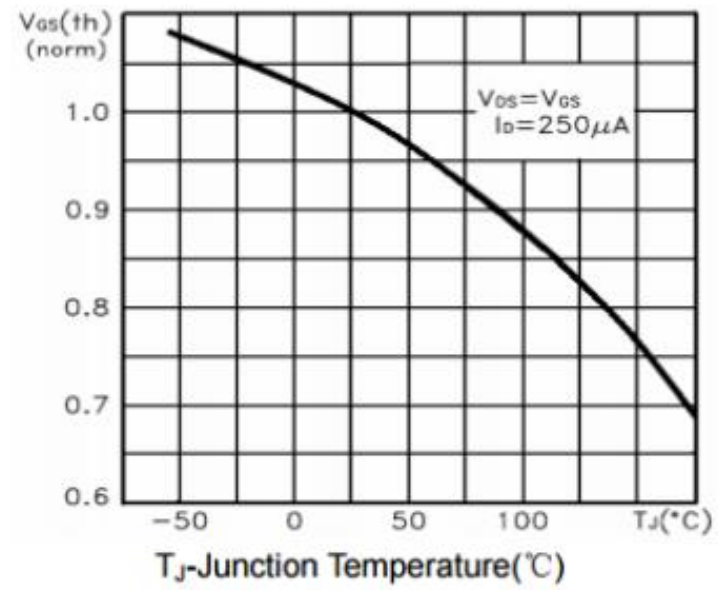


Figure 10 $V_{GS(th)}$ vs Junction Temperature

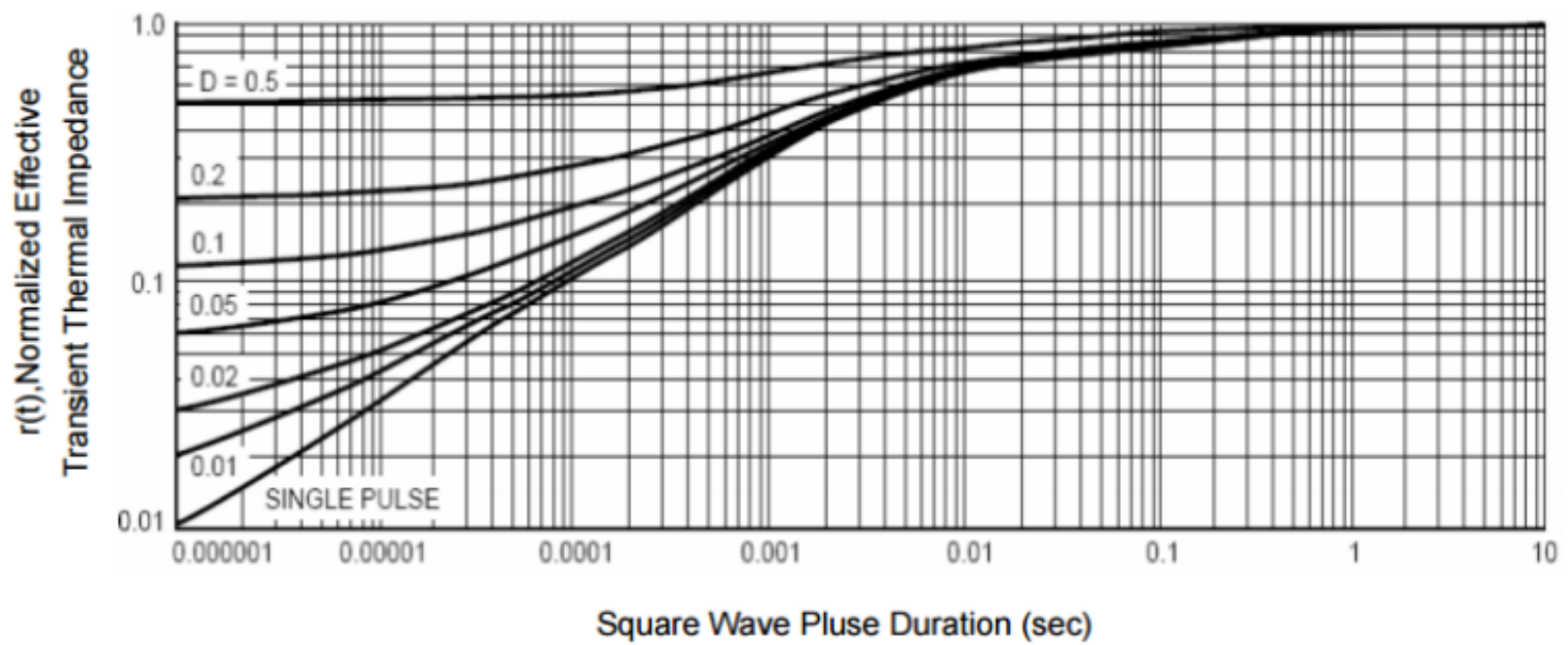
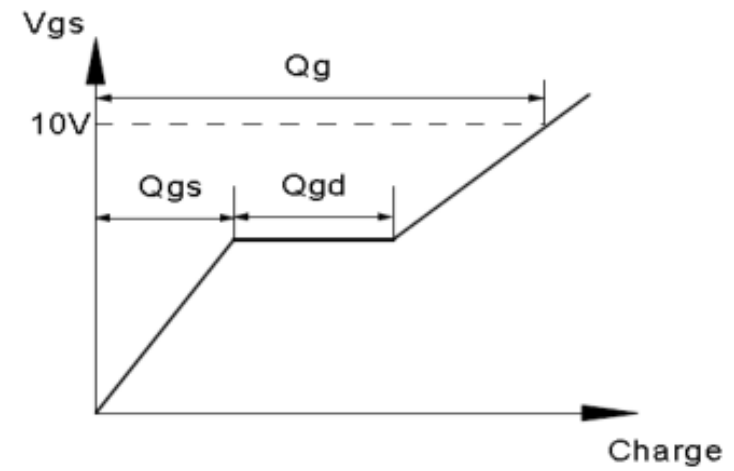
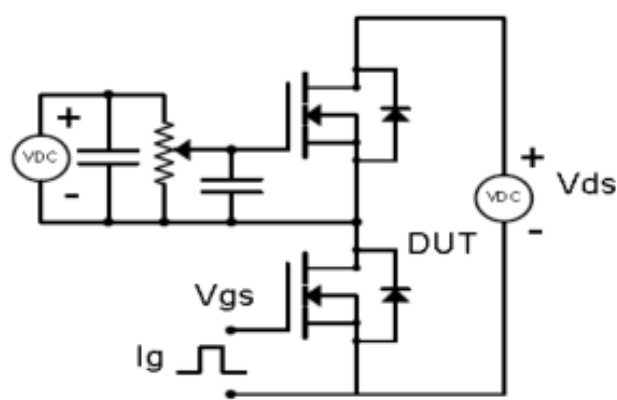


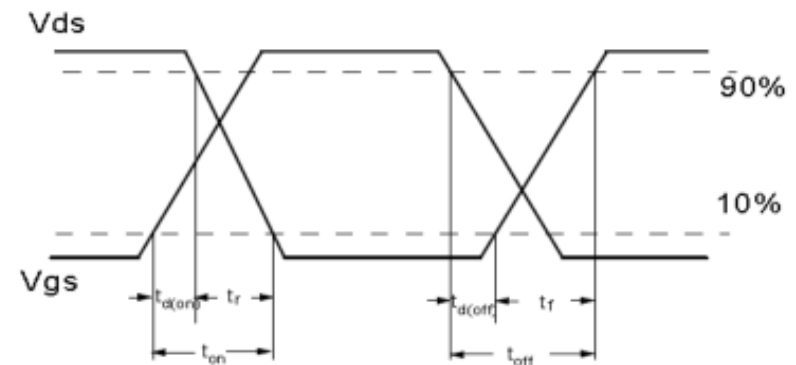
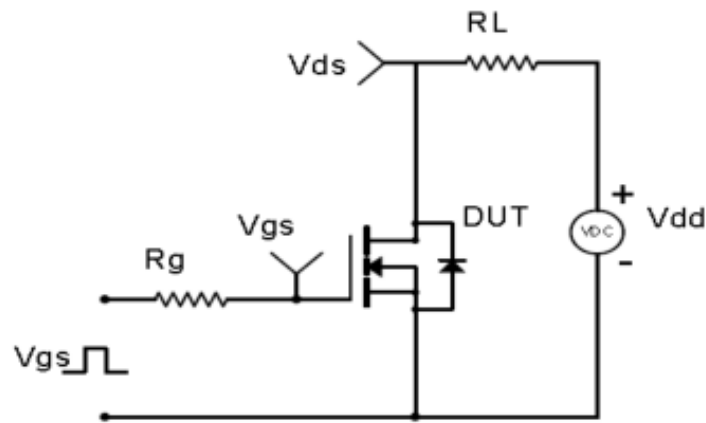
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit & Waveform

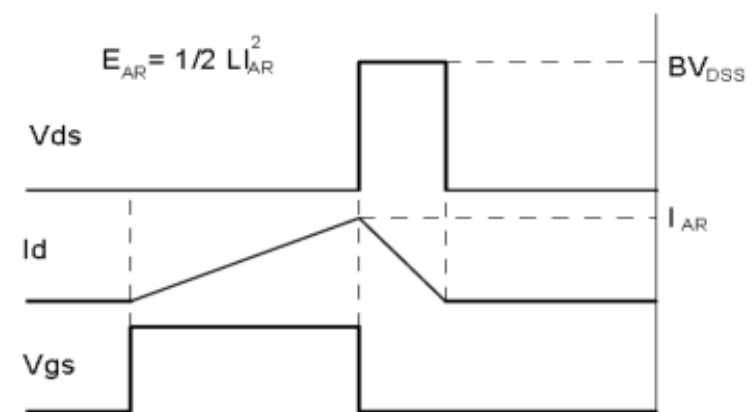
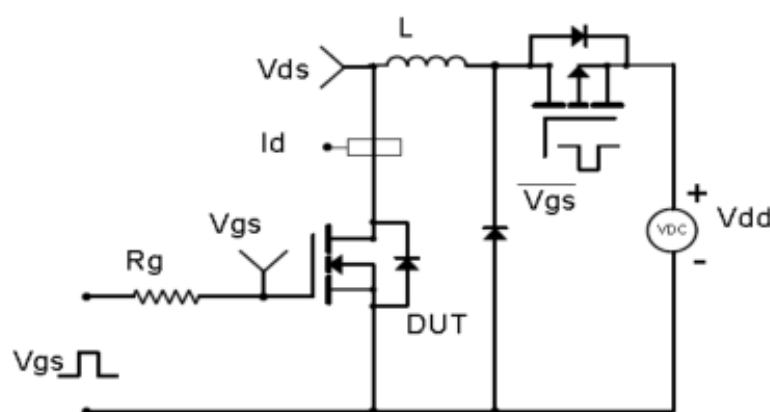
Gate Charge Test Circuit & Waveform



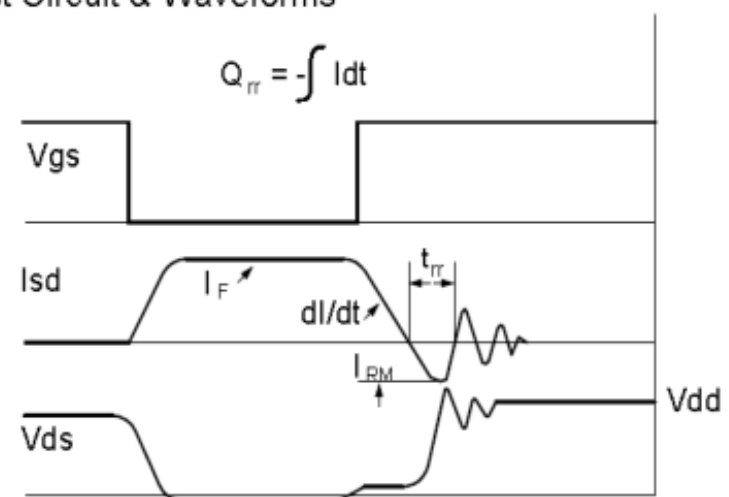
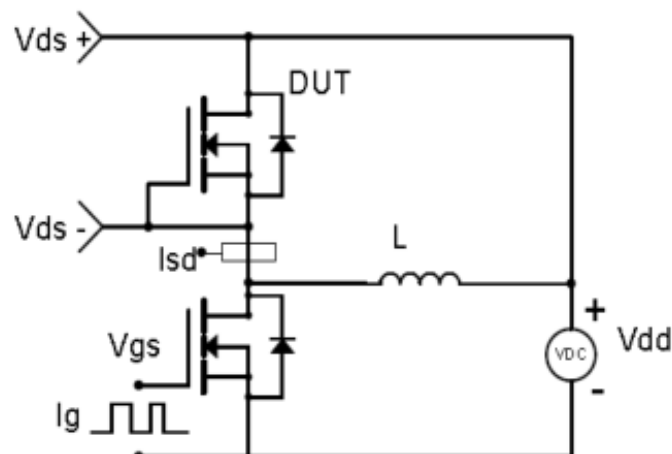
Resistive Switching Test Circuit & Waveforms



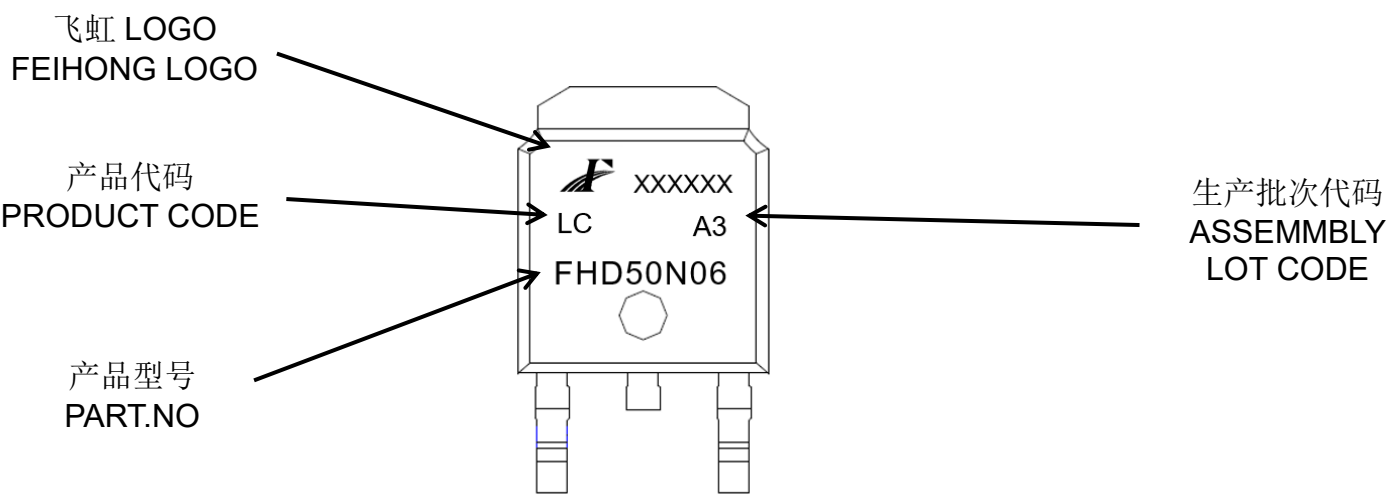
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



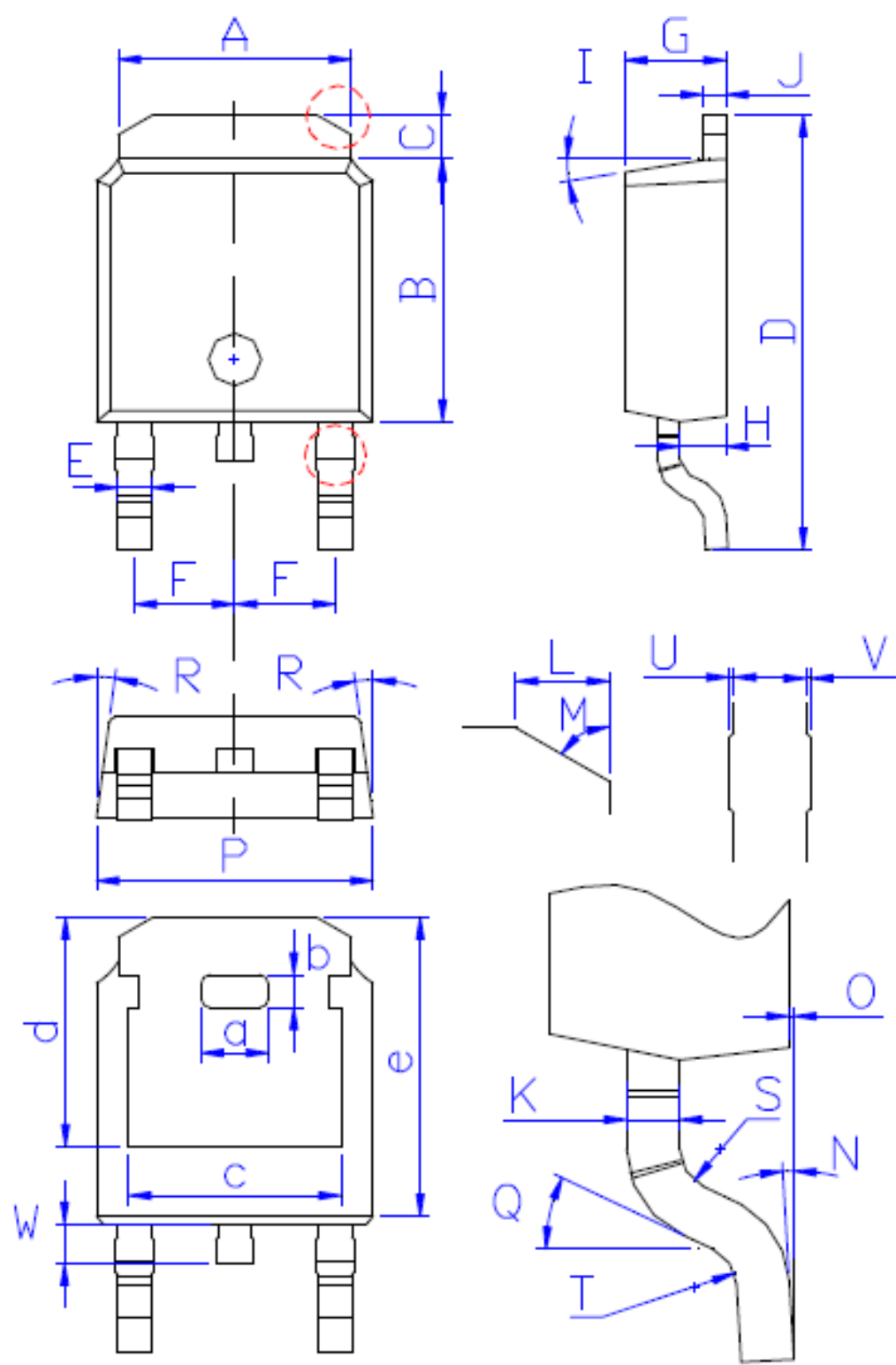
印记 Marking:



外形尺寸:

Package Dimension:

TO-252



DIM	MILLIMETERS
A	5.34±0.30
B	6.00±0.30
C	1.05±0.30
D	9.95±0.30
E	0.76±0.15
F	2.28±0.15
G	2.30±0.30
H	1.06±0.30
I	(4-10)°
J	0.51±0.15
K	0.52±0.15
L	0.80±0.30
M	60°
N	(0-10)°
O	0.05±0.05
P	6.60±0.30
Q	25°
R	(4-8.5)°
S	R0.40
T	R0.40
U	0.05±0.05
V	0.05±0.05
W	0.90±0.30
a	1.80±0.30
b	0.75±0.30
c	4.85±0.30
d	5.30±0.30
e	6.90±0.30

(Units: mm)