



N 沟道增强型场效应晶体管

N-CHANNEL MOSFET

FHP100N8F6A/FHS100N8F6A/FHD100N8F6A

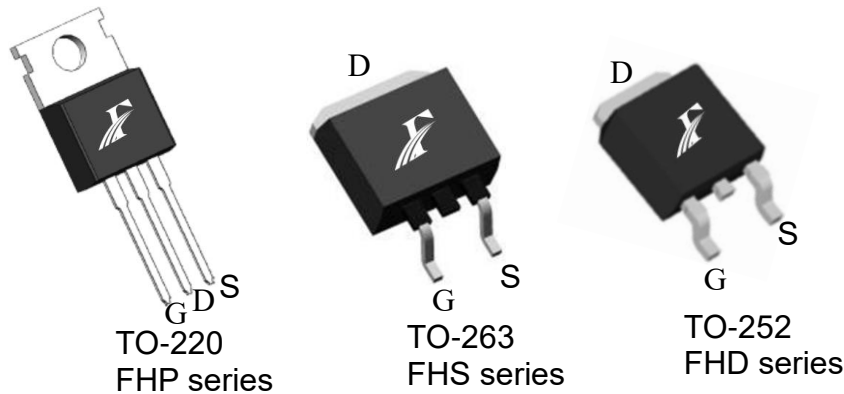
主要参数 MAIN CHARACTERISTICS

ID	120A
VDSS	85 V
Rdson-typ (@Vgs=10V)	5.3 mΩ
Qg-typ	67nC

用途 APPLICATIONS

电池管理系统	BMS
电机控制和驱动	Motor control and drive
不间断电源	UPS
开关电源	Switch Mode Power Supplies

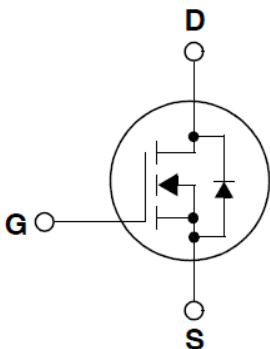
封装形式 Package



产品特性 FEATURES

低栅极电荷	Low gate charge
开关速度快	Fast switching
100%经过 Rg 测试	100% Rg tested
100%经过雪崩测试	100% avalanche tested
100%经过热阻测试	100% DVDS tested
SGT 工艺	SGT technology
RoHS 产品	RoHS product

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
		FHP/D100N8F6A	FHS100N8F6A	
最高漏极—源极直流电压 Drain-Source Voltage	V _{DS}	85		V
连续漏极电流* Drain Current -continuous *	I _D (T _C =25℃), Silicon Limited	120		A
	I _D (T _C =25℃), Package Limited	80		
		I _D (T _C =100℃), Silicon Limited	56	
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I _{DM}	320		A
最高栅源电压 Gate-Source Voltage	V _{GS}	±20		V
单脉冲雪崩能量（注 2） Single Pulsed Avalanche Energy（note 2）	E _{AS}	200		mJ
雪崩电流（注 1） Avalanche Current（note 1）	I _{AR}	20		A
重复雪崩能量（注 1） Repetitive Avalanche Current（note 1）	E _{AR}	16		mJ
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	P _D （TC=25℃）	156		W
	-Derate above 25℃	1.25		W/℃
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}	-55～+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	85	95	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /Δ T _J	I _D =250μA, referenced to 25℃	-	0.08	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =85V, V _{GS} =0V, T _C =25℃	-	-	1	μA
		V _{DS} =68V, T _C =125℃	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2	-	4	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =50A	-	5.3	6.5	mΩ
正向跨导 Forward Transconductance	g _{fs}	V _{DS} = 10V, I _D =50A (note 4)	-	65	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz, V _{DS} OPEN	-	1.5	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =40V, V _{GS} =0V, f=1.0MHz	-	3374	-	pF
输出电容 Output capacitance	C _{oss}		-	507	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	18	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DD} =40V, I _D =50A, R _G =20Ω V _{GS} =10V (note 4, 5)	-	37	-	ns
上升时间 Turn-On rise time	t _r		-	30	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	37	-	ns
下降时间 Turn-Off Fall time	t _f		-	20	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =40V , I _D =50A , V _{GS} =10V (note 4, 5)	-	67	-	nC
栅－源电荷 Gate-Source charge	Q _{gs}		-	19	-	nC
栅－漏电荷 Gate-Drain charge	Q _{gd}		-	37	-	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		-	-	80	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		-	-	320	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =50A	-	-	1.2	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =30A ,dI _F /dt=100A/μs (note 4)	-	48	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	115	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP/D100N8F6A	FHS100N8F6A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.8		℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5		℃/W

- 注释:
- 1: 脉冲宽度由最高结温限制
 - 2: L=1mH, IAS=20A, VDD=48V, RG=25 Ω,起始结温 TJ=25℃
 - 3: ISD ≤80A,di/dt ≤300A/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=20A, VDD=48V, RG=25 Ω,Starting TJ=25℃
 - 3: ISD ≤80A,di/dt ≤300A/μs,VDD≤BVDSS, Starting TJ=25℃
 - 4: Pulse Test: Pulse Width ≤300μs,Duty Cycle≤2%
 - 5: Essentially independent of operating temperature

Typical Performance Characteristics

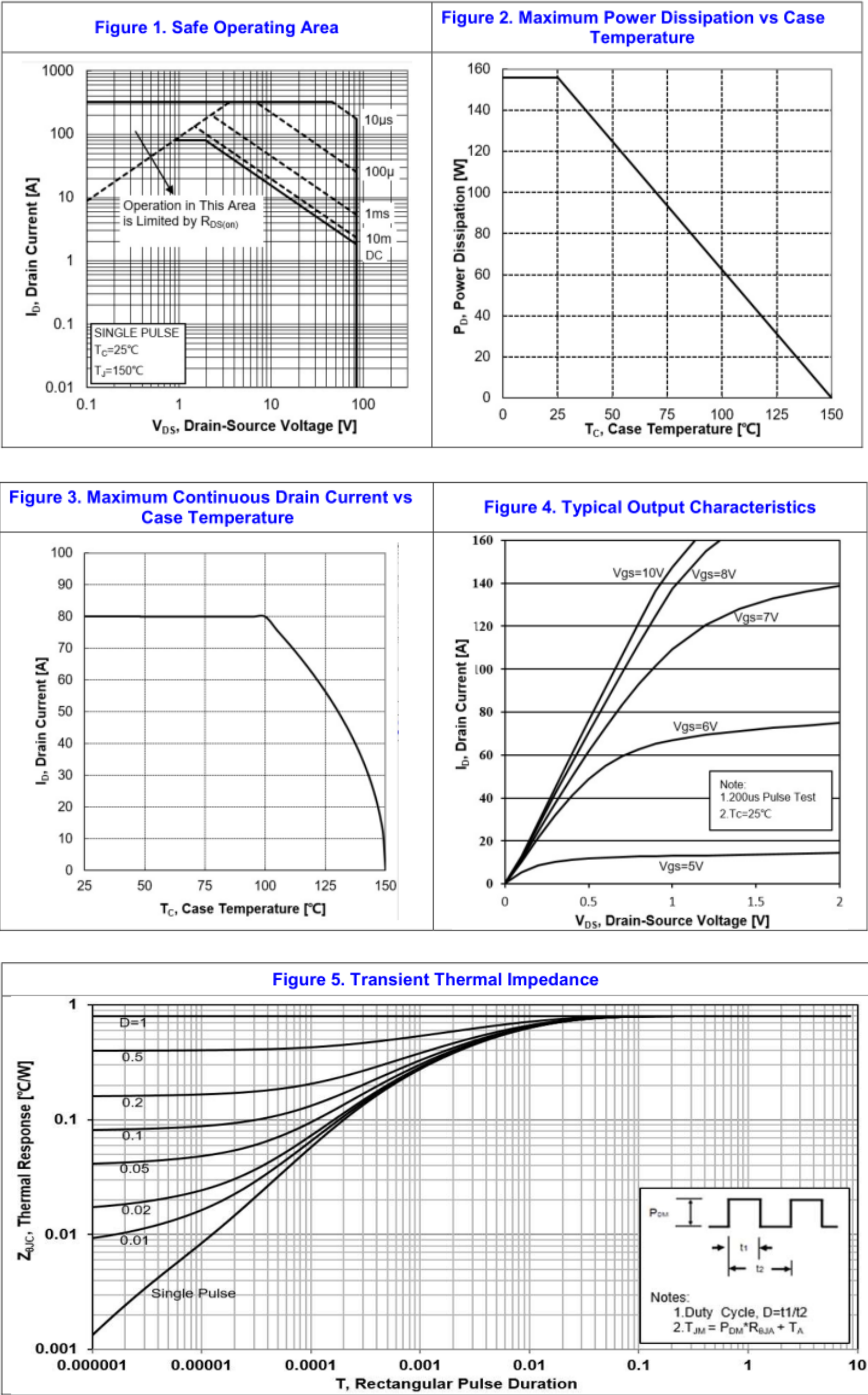


Figure 3. Maximum Continuous Drain Current vs Case Temperature

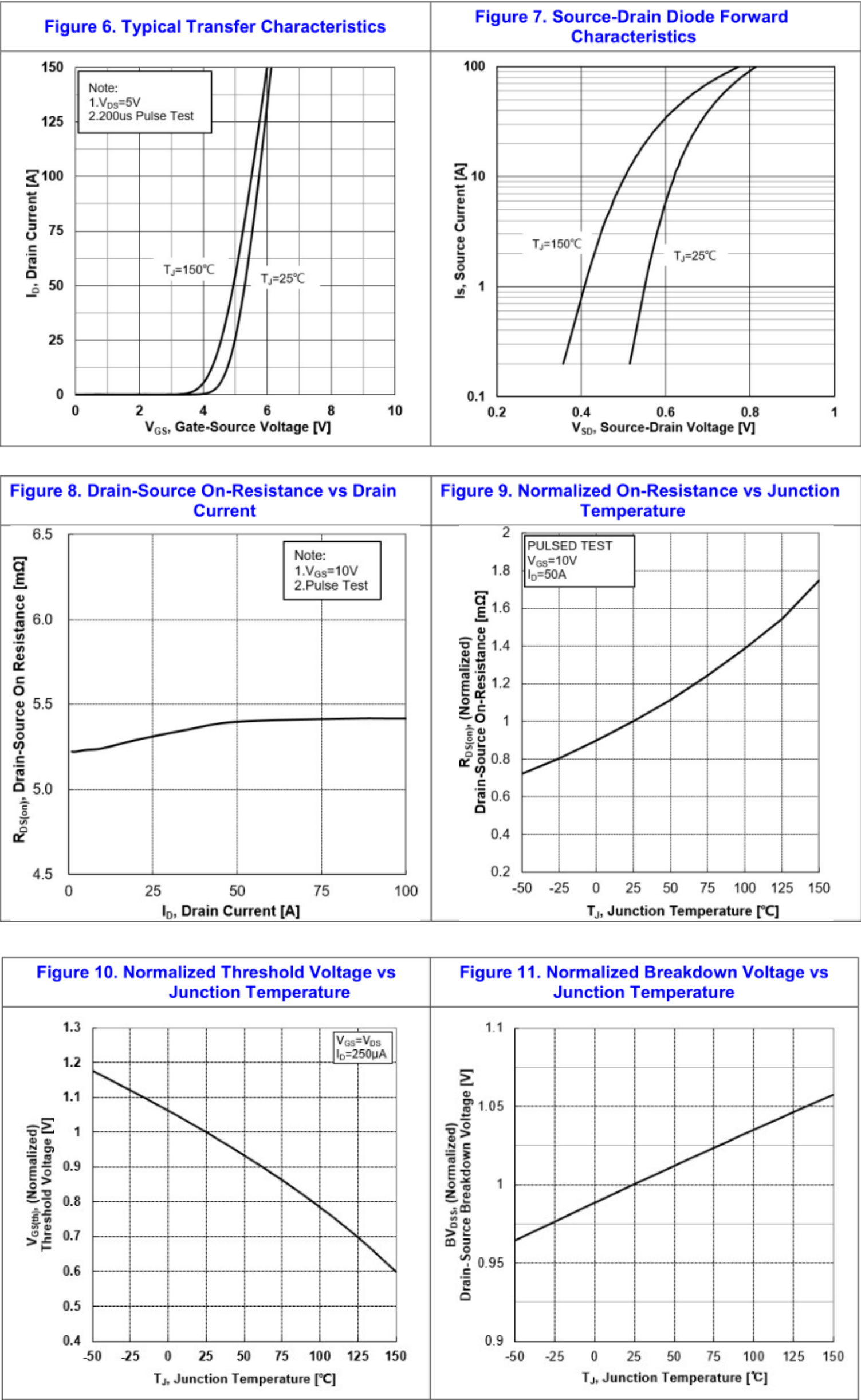
Figure 3 shows the Maximum Continuous Drain Current I_D in Amperes (A) versus Case Temperature T_C in degrees Celsius ($^\circ\text{C}$). The current is constant at 80A for case temperatures up to 100°C and then decreases to 0A at 150°C.

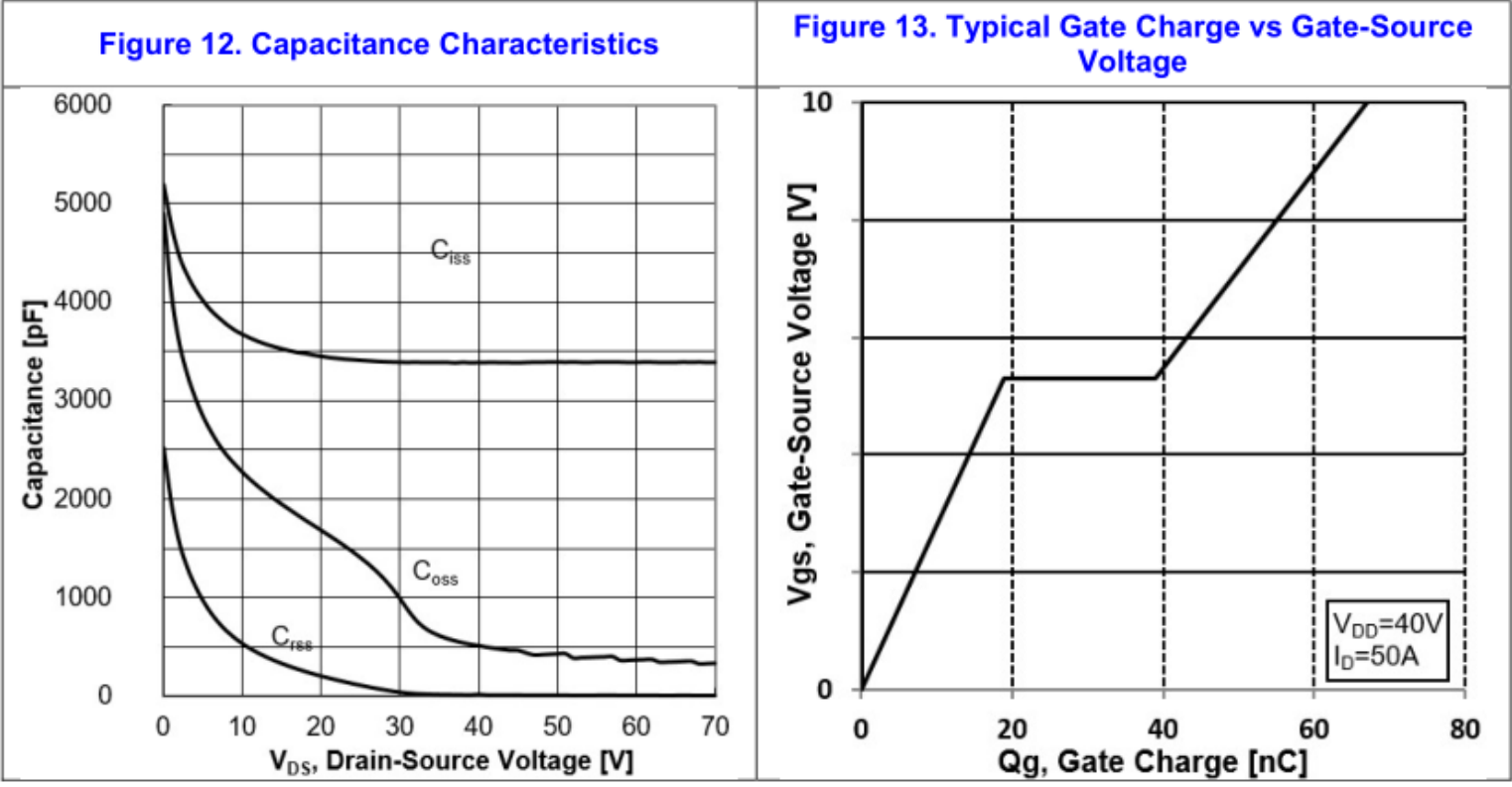
Figure 4. Typical Output Characteristics

Figure 4 shows the Typical Output Characteristics, plotting Drain Current I_D (A) versus Drain-Source Voltage V_{DS} (V) for various Gate-Source Voltages V_{GS} (10V, 8V, 7V, 6V, 5V). The test conditions are: 1. 200µs Pulse Test, 2. $T_C = 25^\circ\text{C}$.

Figure 5. Transient Thermal Impedance

Figure 5 shows the Transient Thermal Impedance $Z_{\theta JA}$ in $^\circ\text{C/W}$ versus Rectangular Pulse Duration T in seconds (s). The graph includes curves for duty cycles $D = 1, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01$, and a Single Pulse. The inset shows a pulse waveform with peak power P_{DM} , pulse width t_1 , and period t_2 . Notes: 1. Duty Cycle, $D = t_1/t_2$; 2. $T_{JM} = P_{DM} \cdot R_{\theta JA} + T_A$.





Test Circuit & Waveform

Figure 14. Resistive Switching Test Circuit

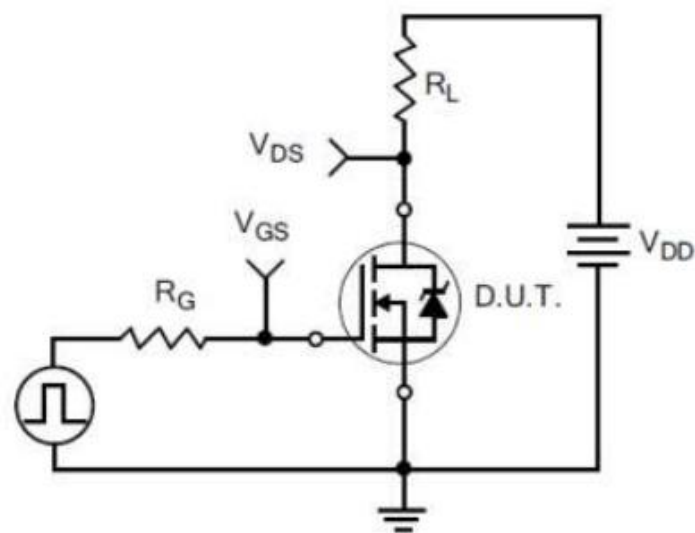


Figure 15. Resistive Switching Waveforms

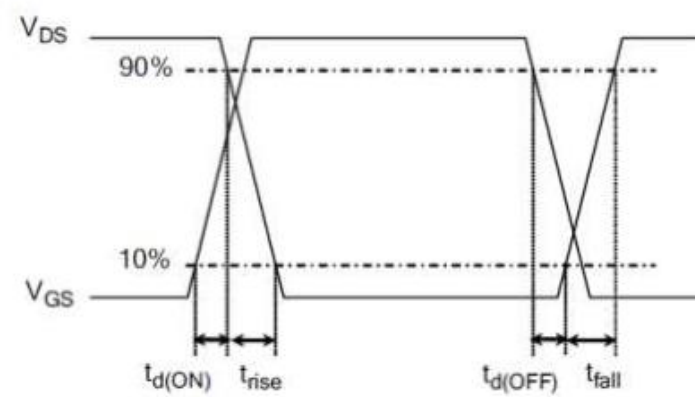


Figure 16. Gate Charge Test Circuit

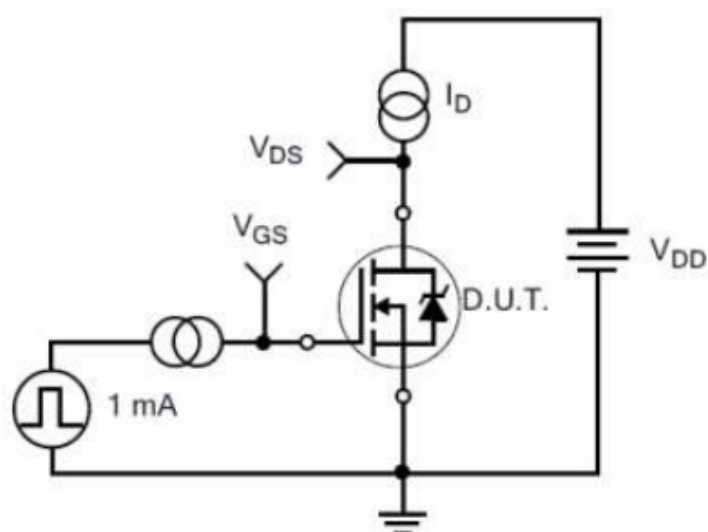


Figure 17. Gate Charge Waveforms

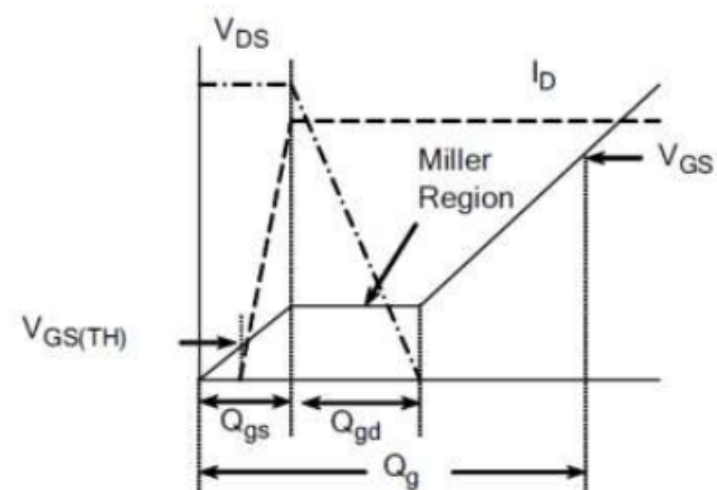


Figure 18. Diode Reverse Recovery Test Circuit

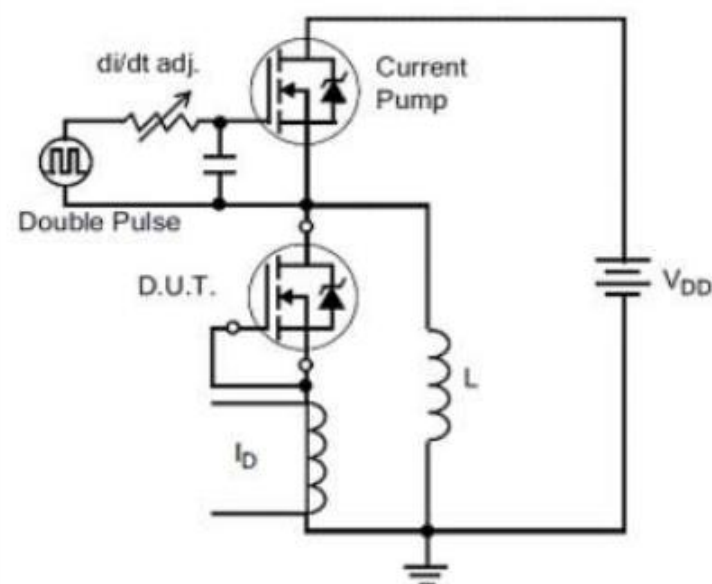
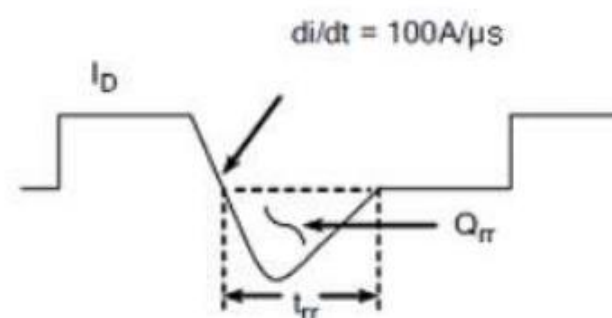
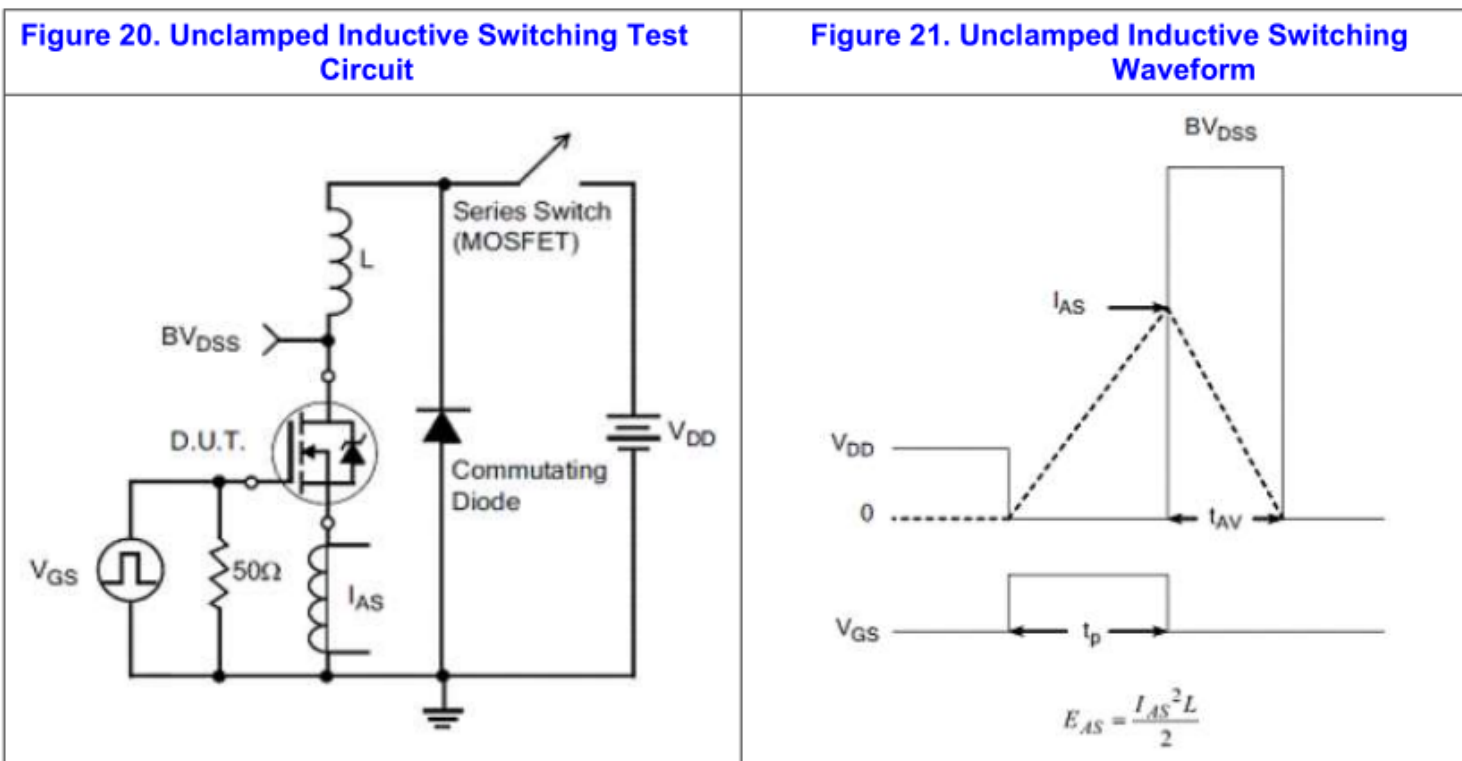
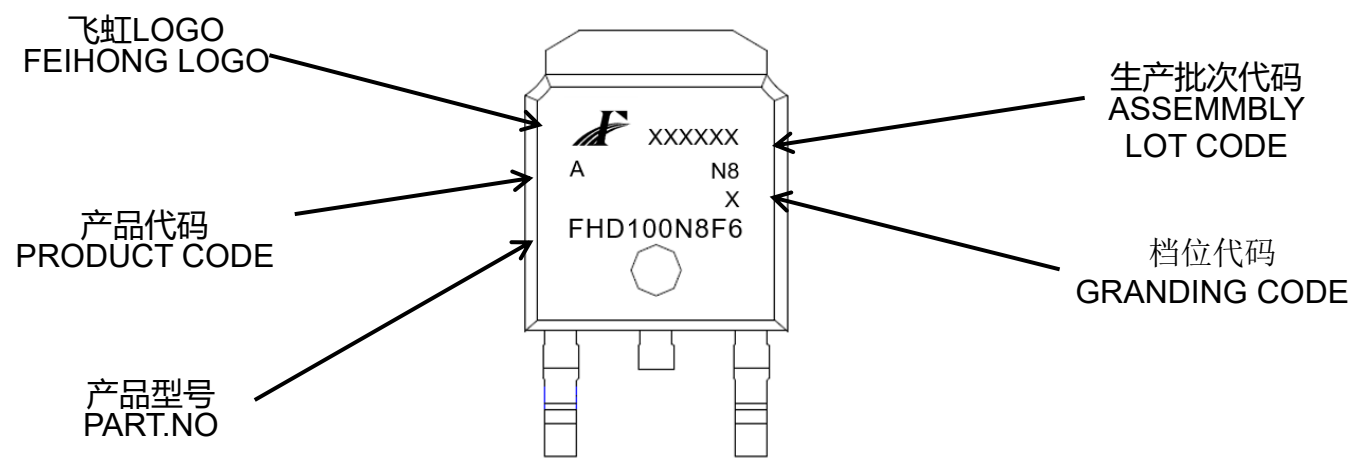
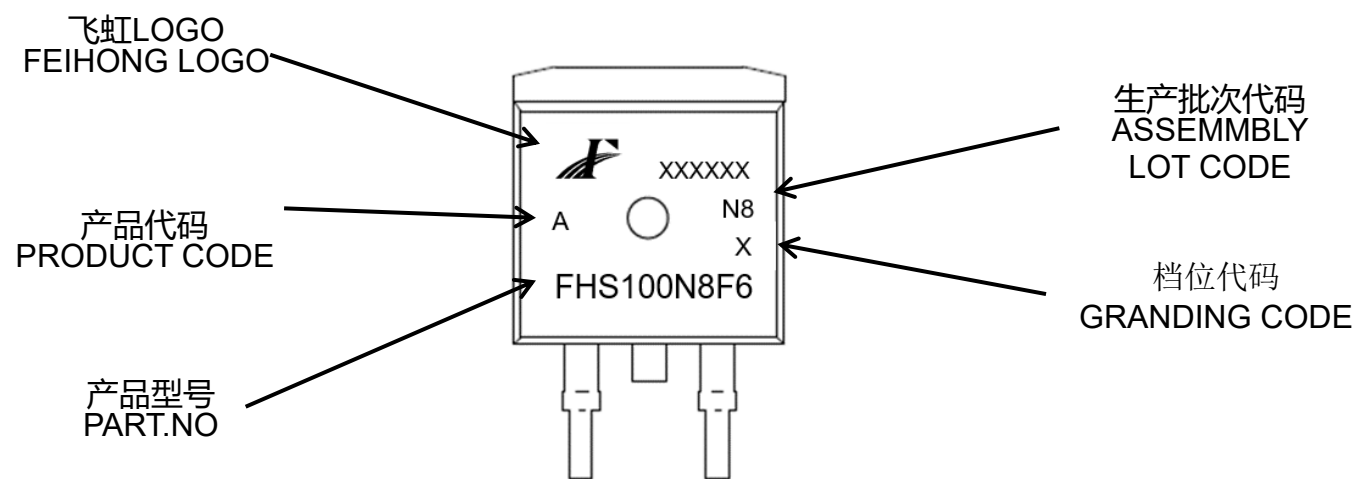
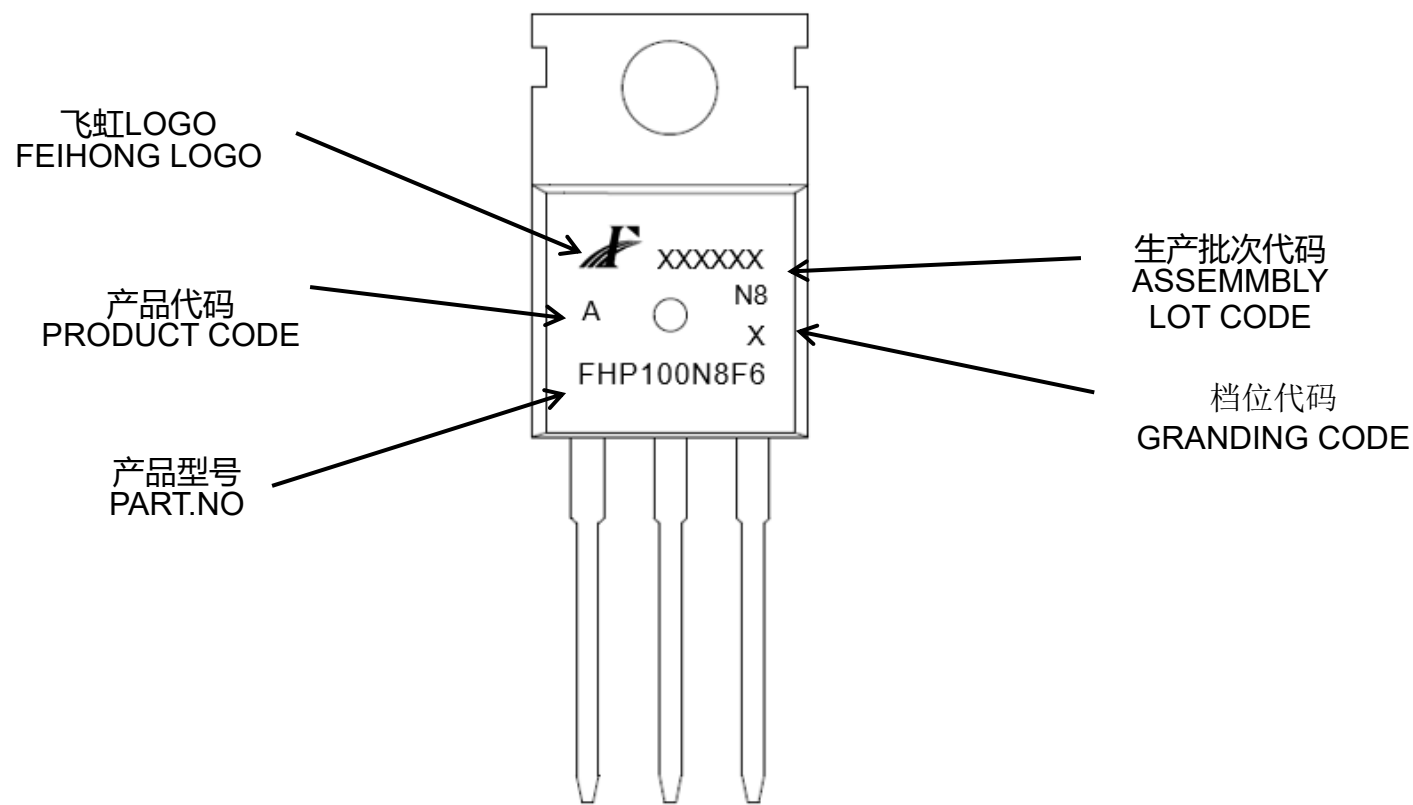


Figure 19. Diode Reverse Recovery Waveform





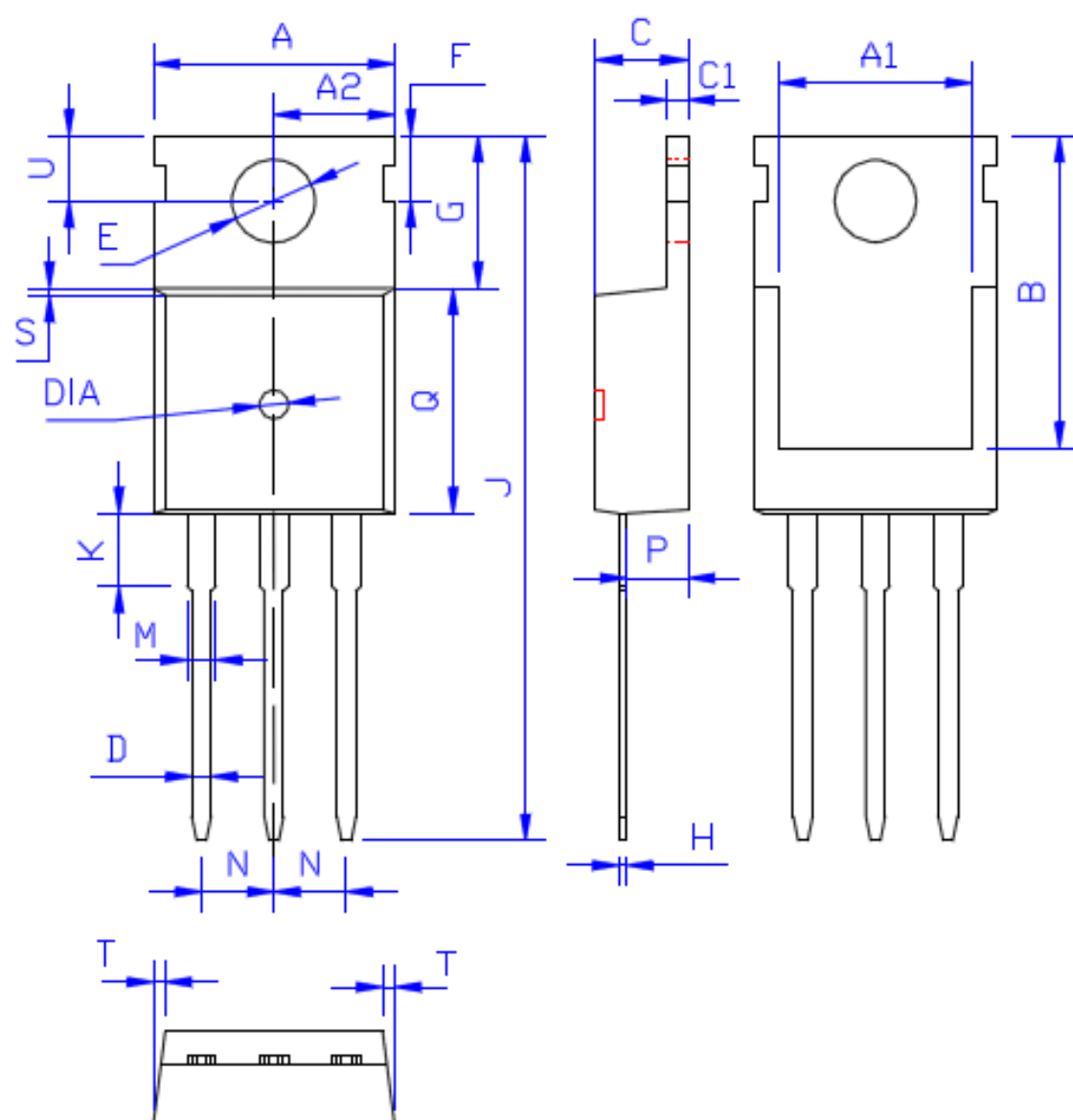
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



DIM	MILLIMETERS
A	10.00 ± 0.30
A1	8.00 ± 0.30
A2	5.00 ± 0.30
B	13.20 ± 0.40
C	4.50 ± 0.20
C1	1.30 ± 0.20
D	0.80 ± 0.20
E	3.60 ± 0.20
F	3.00 ± 0.30
G	6.60 ± 0.40
H	0.50 ± 0.20
J	28.88 ± 0.50
K	3.00 ± 0.30
M	1.30 ± 0.30
N	Typical 2.54
P	2.40 ± 0.40
Q	9.20 ± 0.40
S	0.25 ± 0.15
T	0.25 ± 0.15
U	2.80 ± 0.30
DIA	宽 1.50 ± 0.10 深 0.50 MAX

(Unit: mm)

Package Dimension:

Technical drawing of a 2-pin connector, showing front, side, and detail views with dimensions in millimeters.

Front View (Top Left): Dimensions include overall width E , pin width $E1$, pin diameter $\varnothing 1$, overall height D , and pin spacing e . A hole is indicated with $\varnothing$ DIA.

Side View (Top Right): Dimensions include overall length $L3$, pin length $L4$, pin diameter $\varnothing 2$, pin width $C1$, pin thickness $\varnothing 4$, pin width $\varnothing 5$, pin length $L5$, pin width $L6$, pin thickness $\varnothing 7$, and pin width $C2$. A hole is indicated with $\varnothing$ DIA.

Detail A (Middle Left): Dimensions include pin width $b1 \times 3$, pin width $b \times 2$, and pin width e . A hole is indicated with $\varnothing$ DIA.

Detail A (Middle Right): Dimensions include pin width $b2$ and pin width $b2$. A hole is indicated with $\varnothing$ DIA.

Bottom View (Bottom Left): Dimensions include overall width $E2$, pin width $\varnothing 3 \times 2$, and pin width $D2$. A hole is indicated with $\varnothing$ DIA.

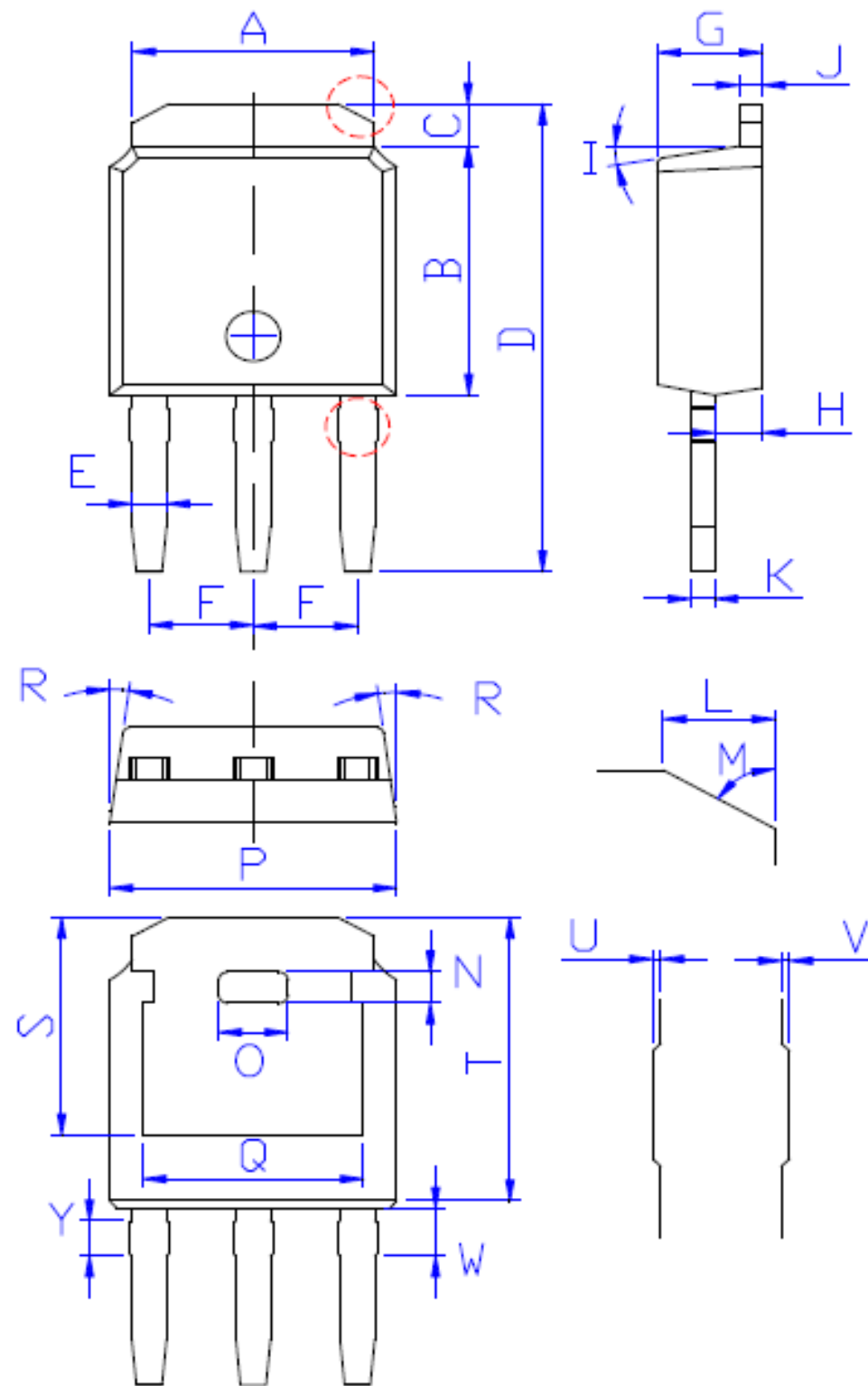
Bottom View (Bottom Right): Dimensions include overall width $D1$, pin width $C3$, pin width $C4$, pin width $C5$, and pin width $\varnothing 6$. A hole is indicated with $\varnothing$ DIA.

标注	尺寸(mm)
E	9.88 ± 0.10
E1	7.40 ± 0.20
E2	9.90 ± 0.15
L	15.20 ± 0.25
L1	1.30 ± 0.15
L2	1.60 ± 0.10
L3	13.00 ± 0.20
L4	10.40 ± 0.15
L5	2.60 ± 0.15
L6	4.80 ± 0.20
b	0.80 ± 0.07
b1	1.27 ± 0.07
b2	0.05 ± 0.07
C	4.48 ± 0.10
C1	1.30 ± 0.07
C2	0.50 ± 0.07
C3	2.40 ± 0.06
C4	0.10 ± 0.08
C5	0.10 ± 0.08
D	9.20 ± 0.10
D1	8.00 ± 0.10
D2	8.00 ± 0.10
R	0.50 ± 0.10
$\theta 1$	$15^{\circ} \pm 2^{\circ}$
$\theta 2$	$3^{\circ} \pm 2^{\circ}$
$\theta 3$	$3^{\circ} \pm 2^{\circ}$
$\theta 4$	$3^{\circ} \pm 2^{\circ}$
$\theta 5$	$3^{\circ} \pm 2^{\circ}$
$\theta 6$	$0^{\circ} \sim 6^{\circ}$
$\theta 7$	$13^{\circ} \pm 2^{\circ}$
e	5.08 ± 0.10
DIA	宽 1.50 ± 0.10 深 0.30 ± 0.15

外形尺寸:

Package Dimension:

TO-251



DIM	MILLIMETERS
A	5.34 ± 0.30
B	6.00 ± 0.30
C	1.05 ± 0.30
D	11.31 ± 0.30
E	0.76 ± 0.15
F	2.28 ± 0.15
G	2.30 ± 0.30
H	1.06 ± 0.30
I	$(4-10)^{\circ}$
J	0.51 ± 0.15
K	0.52 ± 0.15
L	0.80 ± 0.30
M	60°
N	0.75 ± 0.30
O	1.80 ± 0.30
P	6.60 ± 0.30
Q	4.85 ± 0.30
R	$(4-8.5)^{\circ}$
S	5.30 ± 0.30
T	6.90 ± 0.30
U	0.05 ± 0.05
V	0.05 ± 0.05
W	1.15 ± 0.25
Y	0.85 ± 0.25

(Unit: mm)