



N 沟道增强型场效应晶体管

N-CHANNEL MOSFET

FHP3773W/ FHF3773W/FHA3773W

主要参数 MAIN CHARACTERISTICS

ID	40A
VDSS	300V
Rdson-typ（@Vgs=10V）	85mΩ
P _D (T _C =25℃)	310W

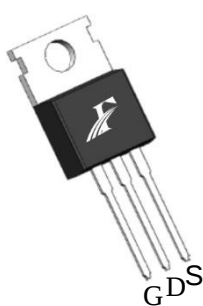
用途 APPLICATION

高频开关电源	High efficiency switch mode power supplies
逆变电源	Power management for inverter systems
户外储能电源	Outdoor energy storage power

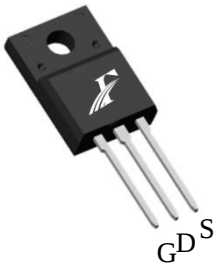
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 2.5pF)	Low Crss (typical 2.5pF)
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
平面工艺	Planar process
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

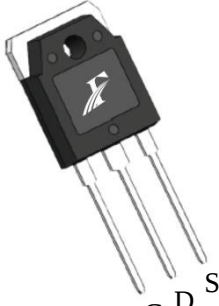
封装形式 Package



TO-220
FHP series

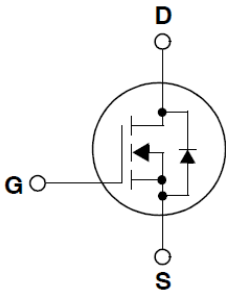


TO-220F
FHF series



TO-3PN
FHA series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS（T_C=25℃）

项目 Parameter	符号 Symbol	数值 Value			单位 Unit
		FHF3773W	FHP3773W	FHA3773W	
最高漏极—源极直流电压 Drain-Source Voltage	V _{DS}	300			V
连续漏极电流* Drain Current -continuous *	I _D （T _C =25℃）	40			A
	I _D （T _C =100℃）	26			A
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I _{DM}	160			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}	2000			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}	18			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℃）	73	230	310	W
	-Derate above 25℃	0.58	1.84	2.48	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	300	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /Δ T _J	I _D =250μA, referenced to 25℃	-	0.3	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =300V,V _{GS} =0V, T _C =25℃	-	-	1	μA
		V _{DS} =240V, T _C =125℃	-	-	10	μA
栅极体漏电流 Gate-body leakage current	I _{GSS} (F/R)	V _{DS} =0V, V _{GS} =±30V	-	-	±100	μA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2.0	3.0	4.0	V
静态导通电阻 Static Drain-Source On- Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =20A	-	85	100	mΩ
正向跨导 Forward Transconductance	g _{fs}	V _{DS} = 15V, I _D =20A (note 4)	-	27	-	S
动态特性 Dynamic Characteristics						
栅电阻 Gate Resistance	R _g	f=1.0MHz,V _{DS} OPEN	-	1.2	-	Ω
输入电容 Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	3870	-	pF
输出电容 Output capacitance	C _{oss}		-	360	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	2.5	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =125V, I _D =40A, R _G =15Ω (note 4, 5)	-	80	-	ns
上升时间 Turn-On rise time	t _r		-	620	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	140	-	ns
下降时间 Turn-Off Fall time	t _f		-	183	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =240V , I _D =40A , V _{GS} =10V (note 4, 5)	-	76	-	nC
栅－源电荷 Gate-Source charge	Q _{gs}		-	11	-	nC
栅－漏电荷 Gate-Drain charge	Q _{gd}		-	30	-	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		-	-	40	A
正向最大脉冲电流 Maximum Pulsed Drain- Source Diode Forward Current	I _{SM}		-	-	160	A
正向压降 Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =40A	-	-	1.2	V
反向恢复时间 Reverse recovery time	t _{rr}	V _{GS} =0V, I _S =40A ,dI _F /dt=100A/μs (note 4)	-	230	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	2.1	-	μC

热特性 THERMAL CHARACTERISTIC

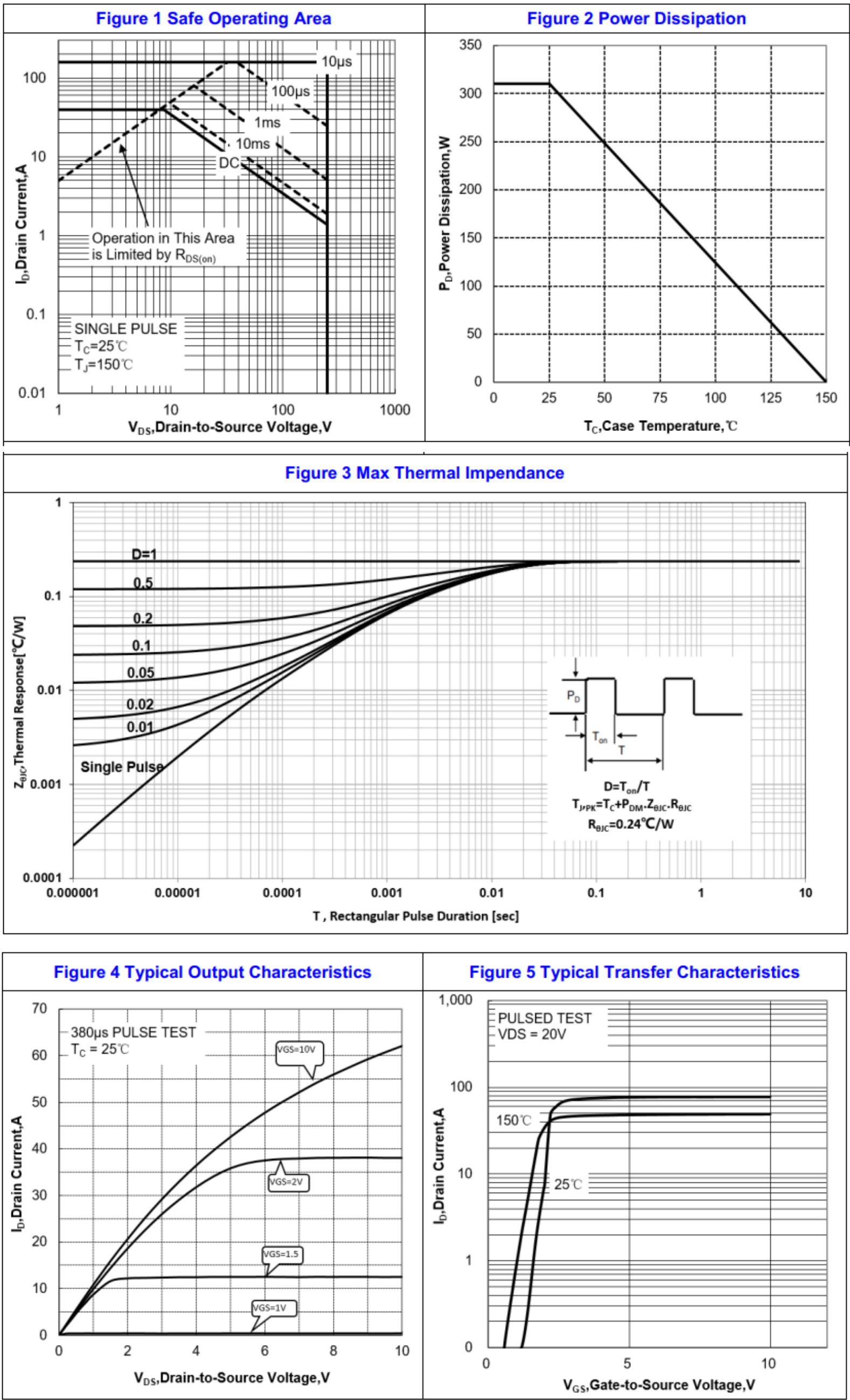
项目 Parameter	符号 Symbol	FHF3773W	FHP3773W	FHA3773W	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	1.71	0.54	0.40	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	62.5	40	°C/W

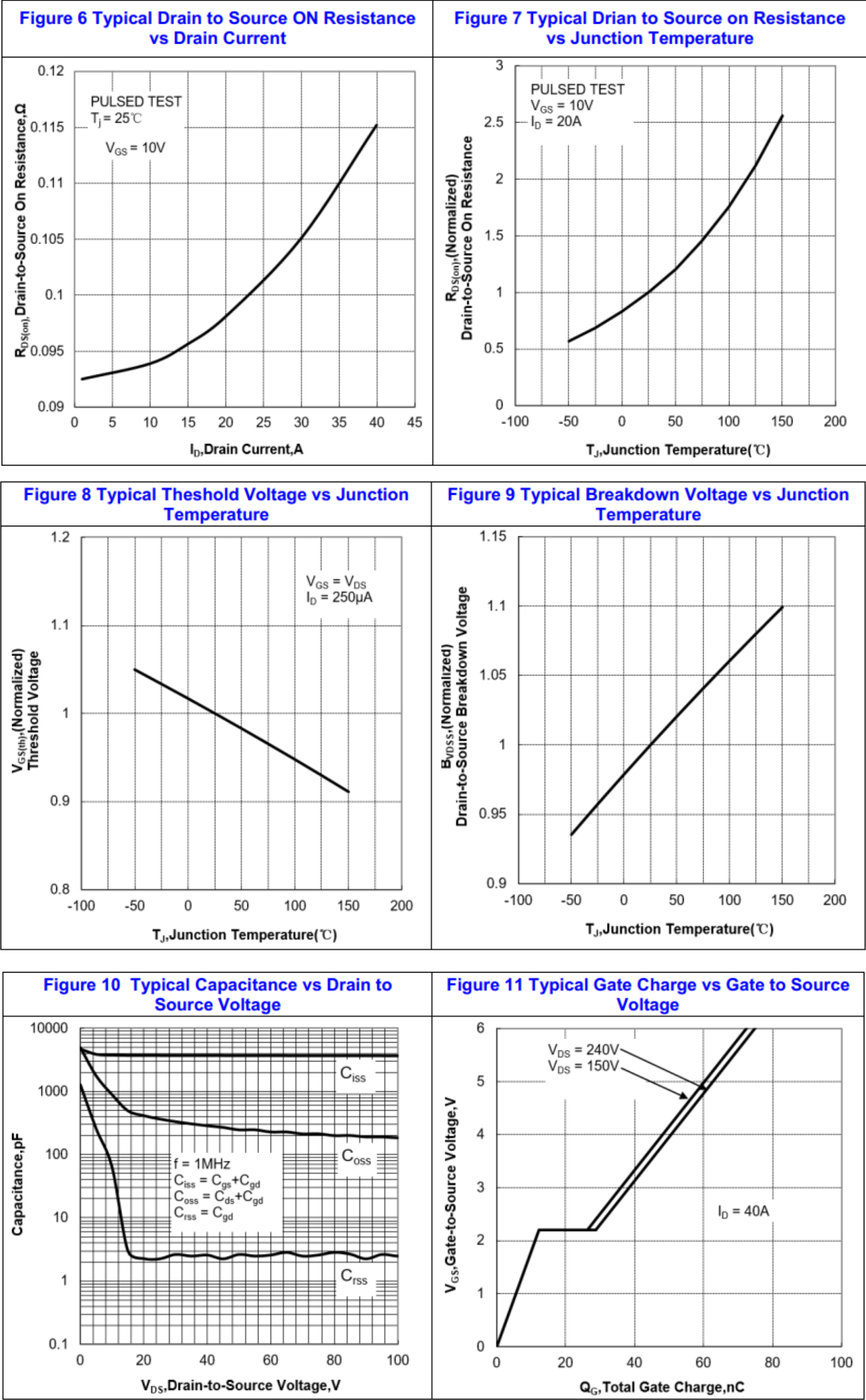
注释:
Notes:

- 1: 脉冲宽度由最高结温限制
- 2: L=10mH, IAS=20A, VDD=50V, RG=25 Ω,起始结温 TJ=25℃
- 3: ISD ≤40A,di/dt ≤100A/μs,VDD≤BV_{DSS},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

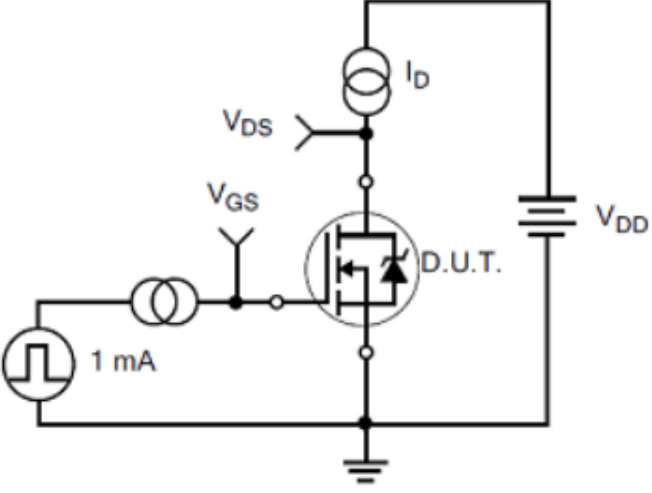
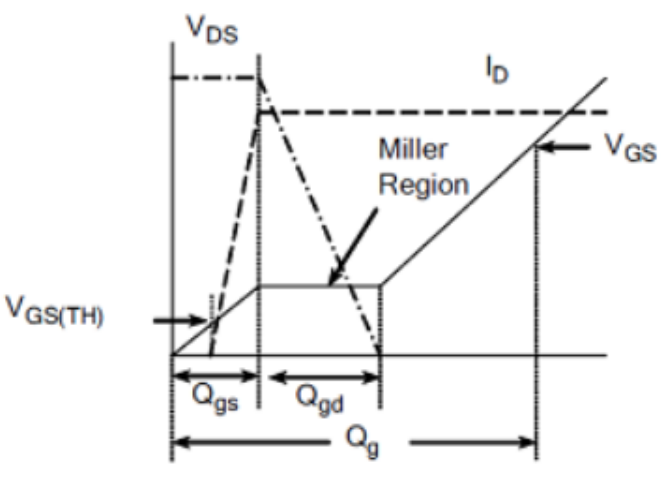
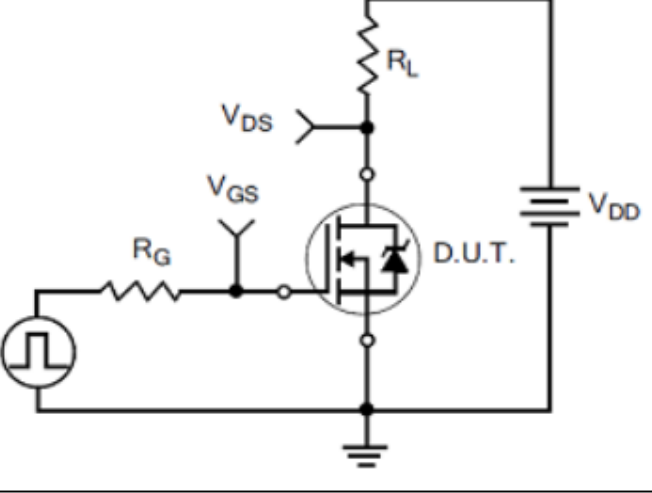
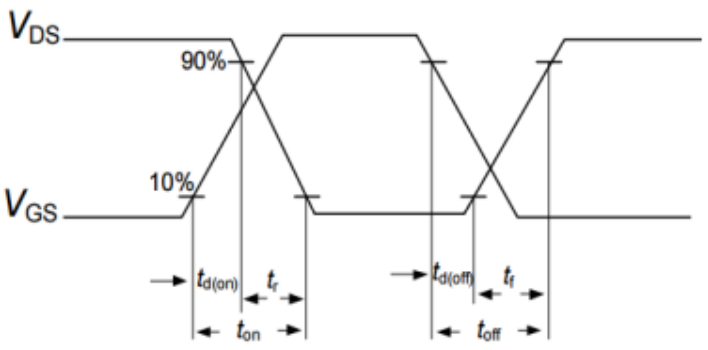
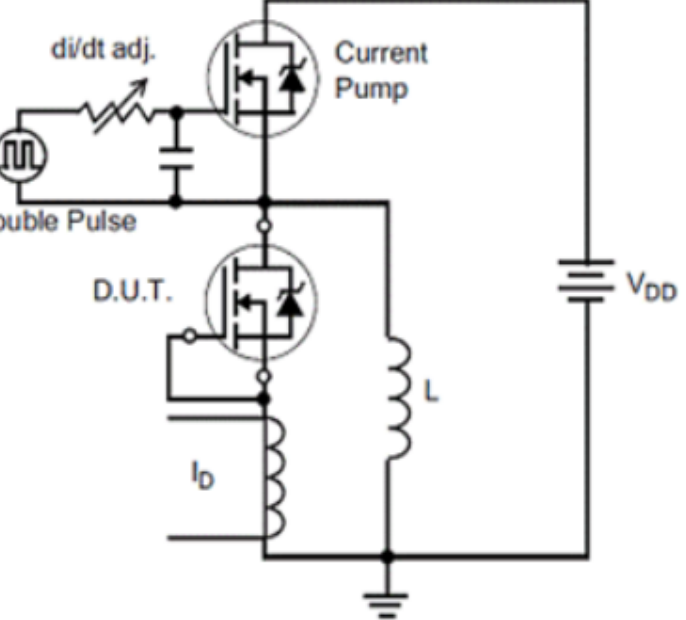
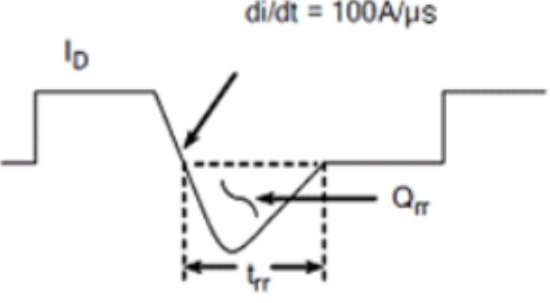
- 1: Pulse width limited by maximum junction temperature
- 2: L=10mH, IAS=20A, VDD=50V, RG=25 Ω ,Start TJ=25℃.
- 3: ISD ≤40A,di/dt ≤100A/μs,VDD≤BV_{DSS}, Starting TJ=25℃
- 4: Pulse Test： Pulse Width ≤300μs,Duty Cycle≤2%
- 5: Essentially independent of operating temperature

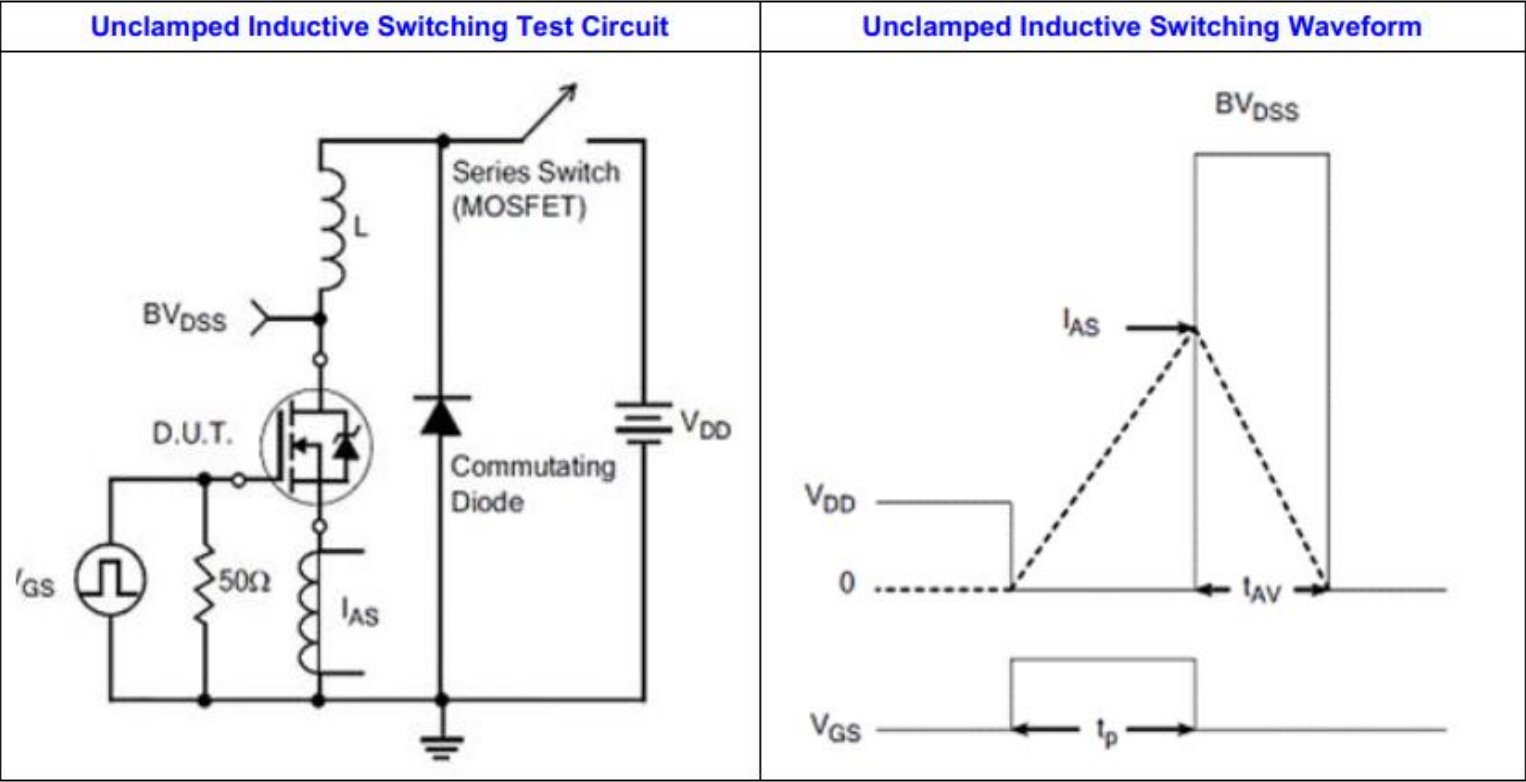
ELECTRICAL CHARACTERISTICS (curves)



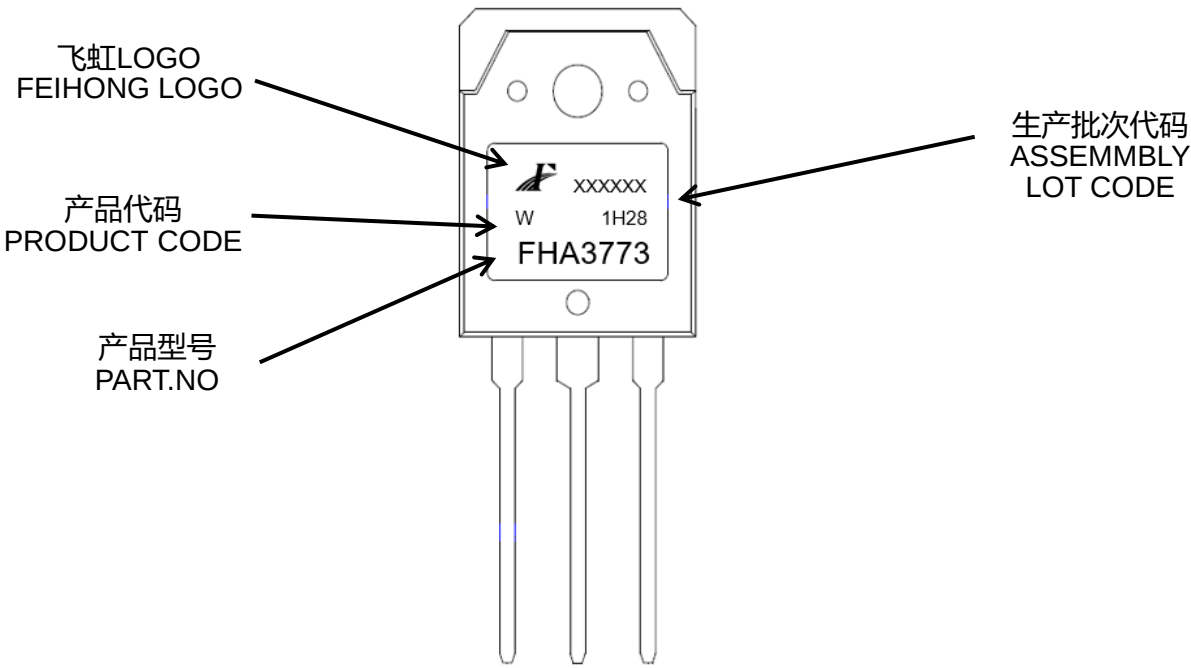
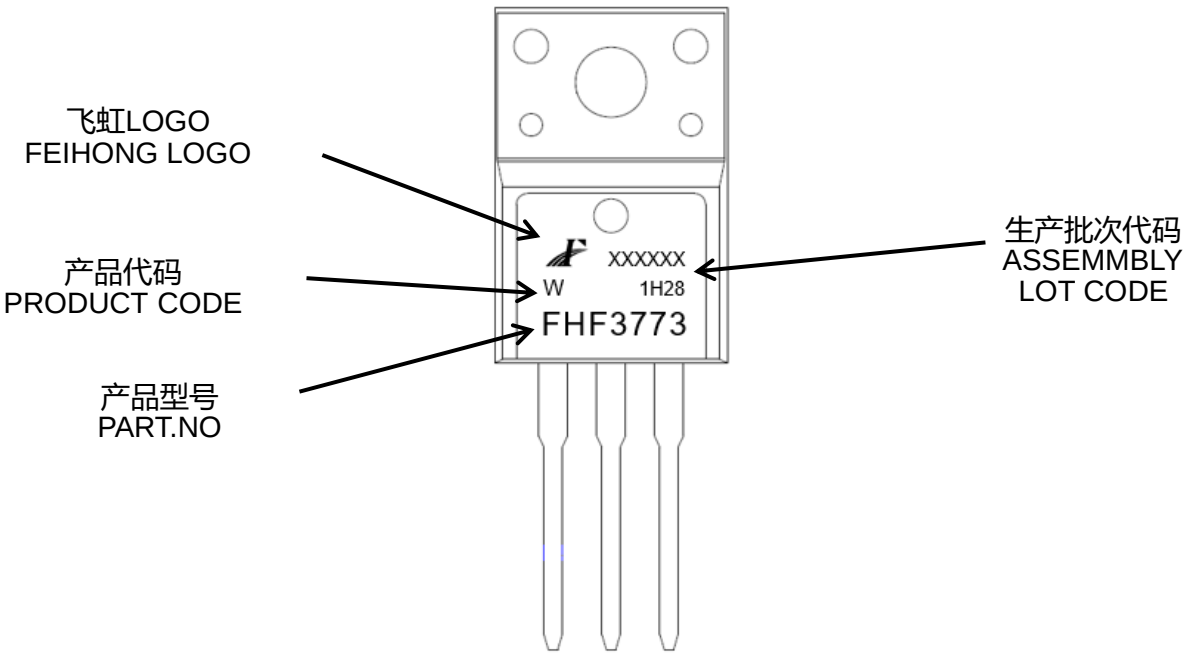
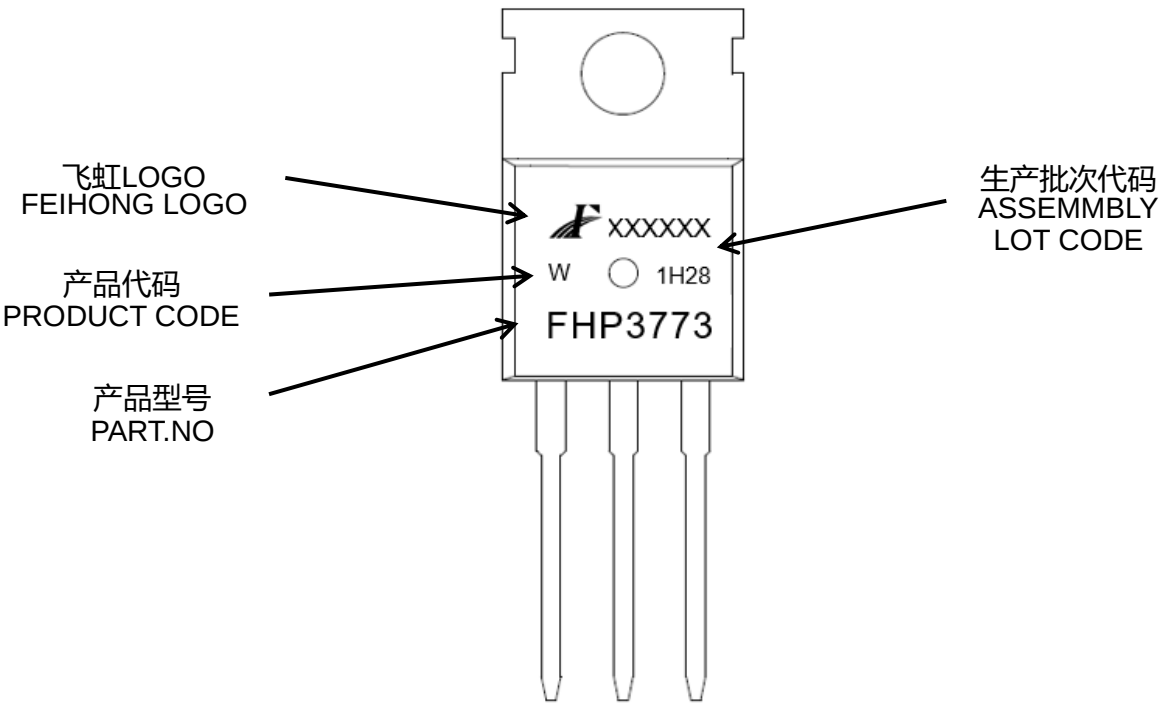


测试电路 Test circuits

Gate Charge Test Circuit  The diagram shows a MOSFET (D.U.T.) with its gate connected to a 1 mA current source and its drain to a load resistor and a drain current source I_D. The gate voltage is V_{GS} and the drain voltage is V_{DS}. The supply voltage is V_{DD}.	Gate Charge Waveforms  The diagram shows the relationship between V_{GS} and I_D during switching. It identifies the Miller Region, the threshold voltage $V_{GS(TH)}$, and the gate charges Q_{gs}, Q_{gd}, and Q_g.
Resistive Switching Test Circuit  The diagram shows a MOSFET (D.U.T.) with its gate connected to a current source and its drain to a load resistor R_L. The gate voltage is V_{GS} and the drain voltage is V_{DS}. The supply voltage is V_{DD} and the gate resistor is R_G.	Resistive Switching Waveforms  The diagram shows the switching waveforms for V_{DS} and V_{GS}. It labels the 90% and 10% voltage levels, the turn-on time $t_{d(on)}$, the rise time t_r, the turn-off time $t_{d(off)}$, and the fall time t_f.
Diode Reverse Recovery Test Circuit  The diagram shows a MOSFET (D.U.T.) with its gate connected to a current source and its drain to a diode and an inductor L. The gate voltage is V_{GS} and the drain voltage is V_{DS}. The supply voltage is V_{DD}. A double pulse is applied to the gate, and a current pump is used to adjust the di/dt.	Diode Reverse Recovery Waveform  The diagram shows the reverse recovery waveform for the diode. It labels the reverse recovery charge Q_{rr} and the reverse recovery time t_{rr}. The di/dt is specified as 100 A/μs.



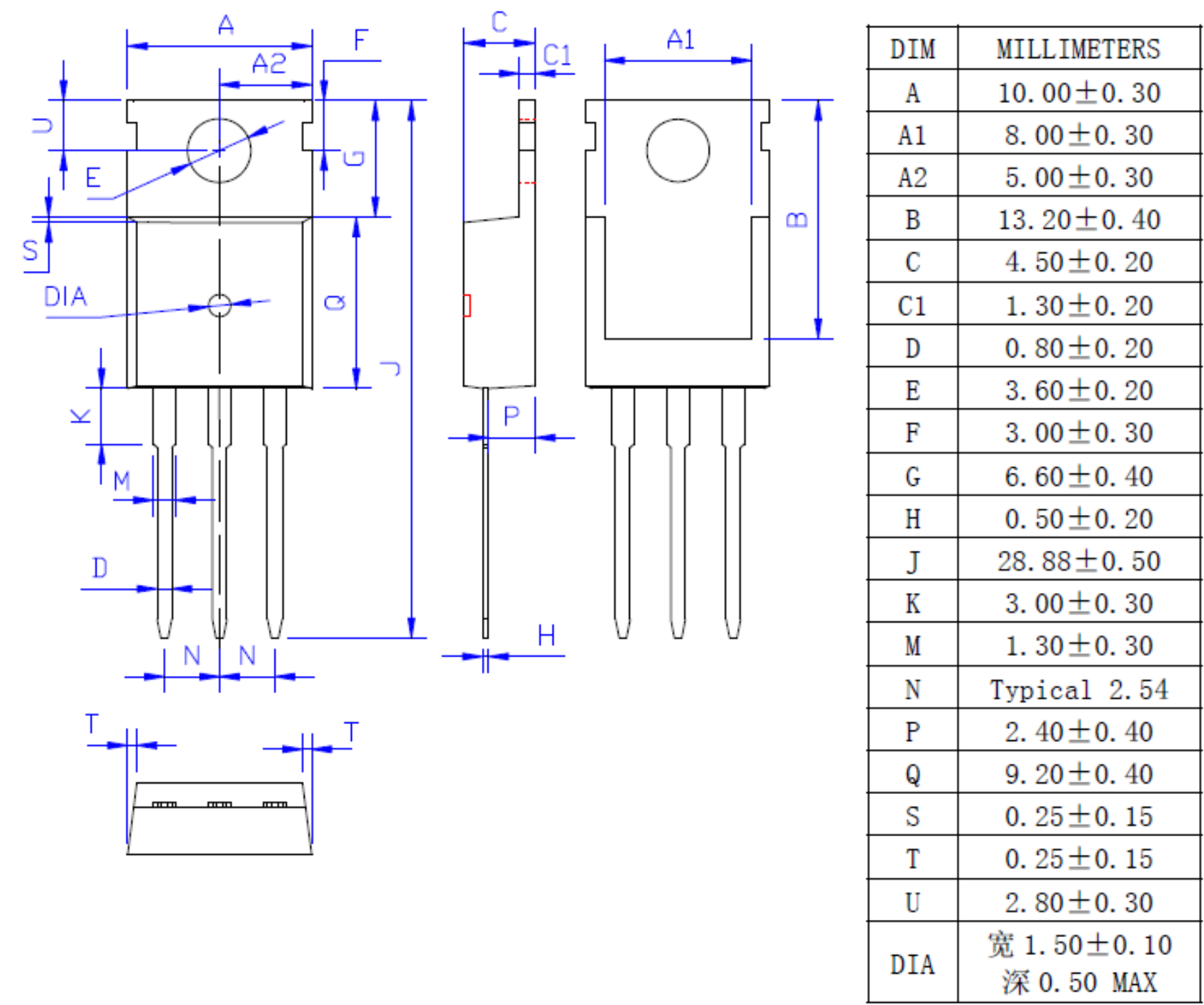
印记 Marking



外形尺寸:

Package Dimension:

TO-220

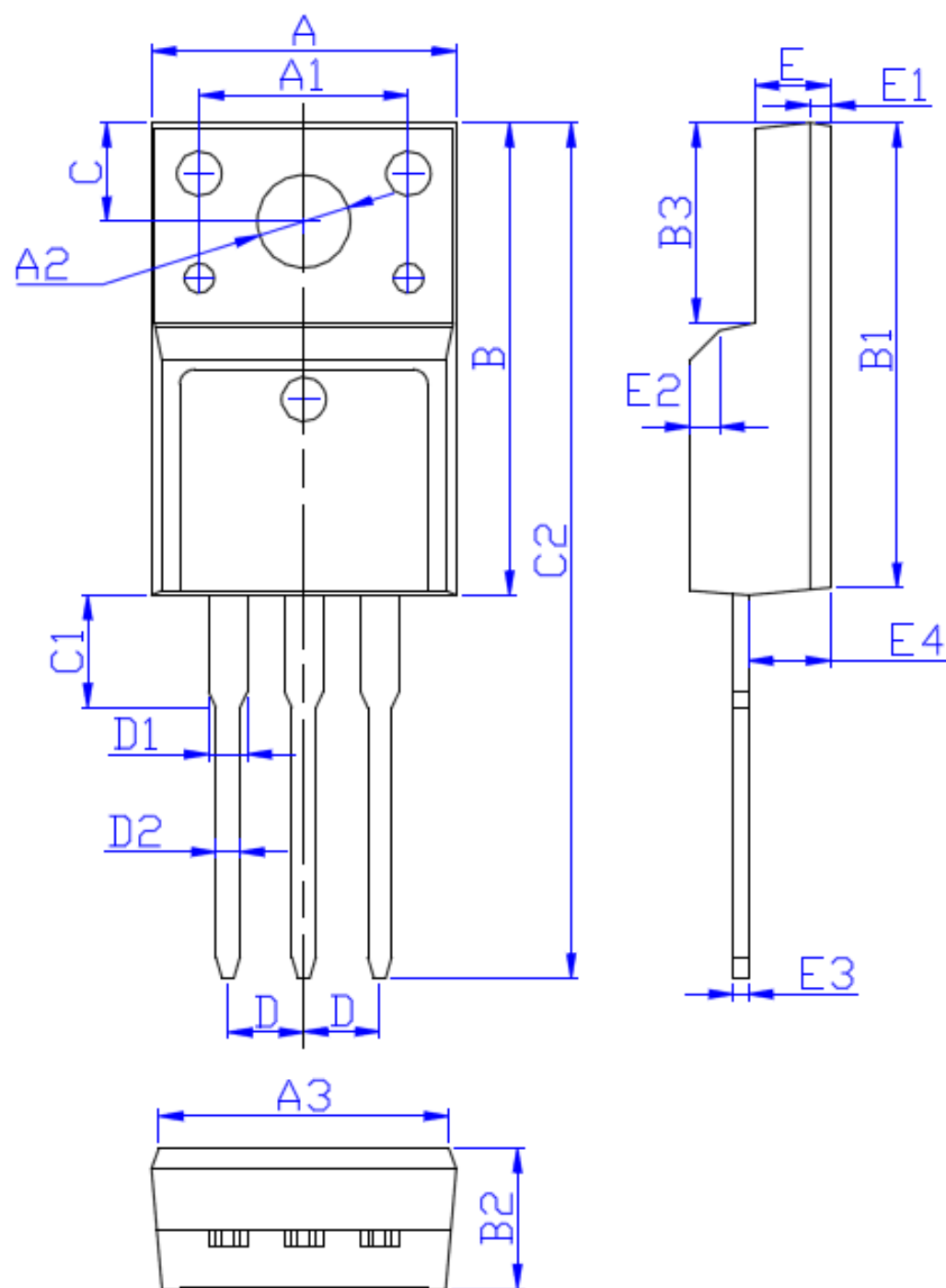


(Unit: mm)

外形尺寸:

Package Dimension:

TO-220F



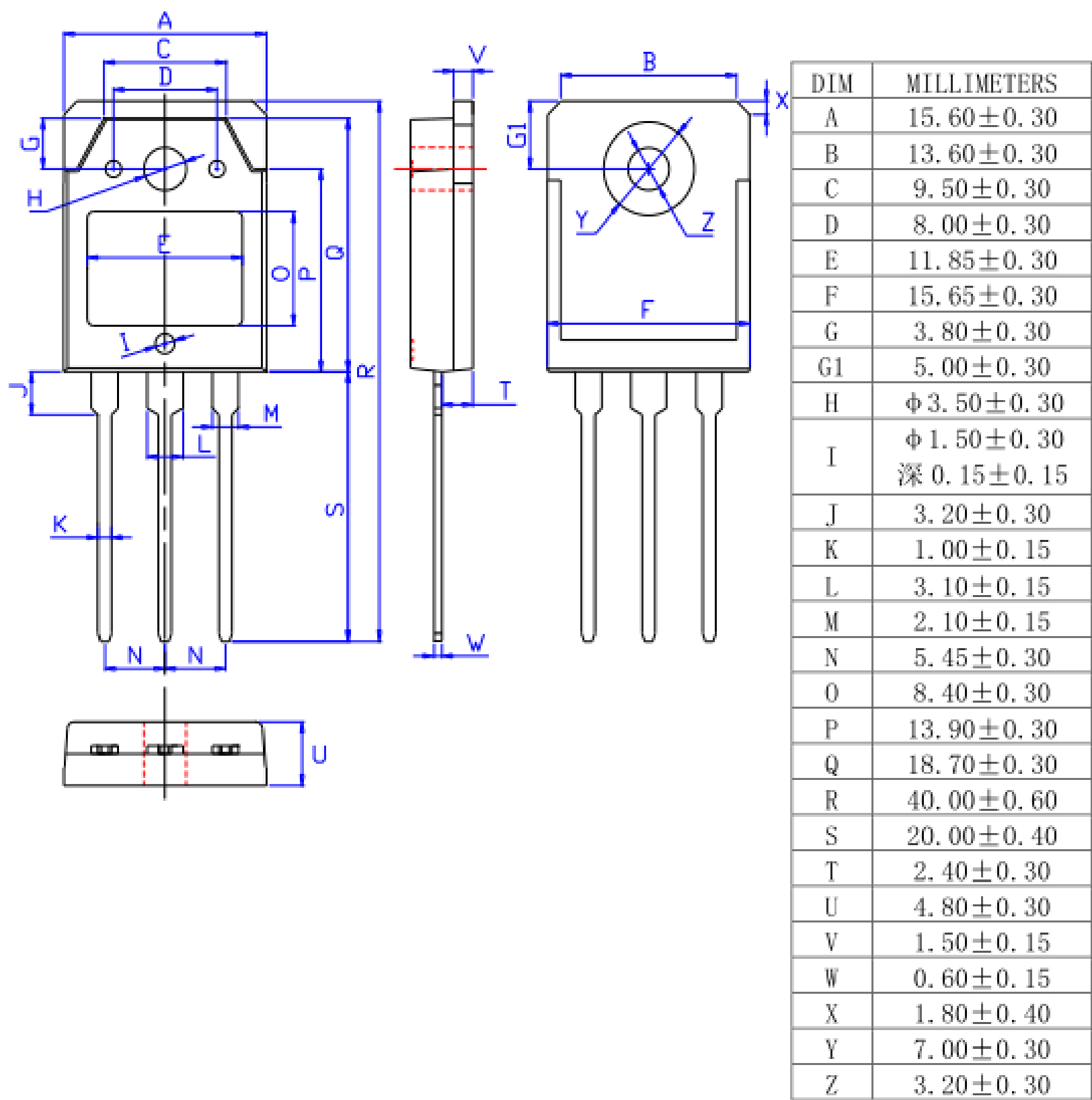
DIM	MILLIMETERS
A	10.16 ± 0.30
A1	7.00 ± 0.20
A2	3.12 ± 0.20
A3	9.70 ± 0.30
B	15.90 ± 0.50
B1	15.60 ± 0.50
B2	4.70 ± 0.30
B3	6.70 ± 0.30
C	3.30 ± 0.25
C1	3.25 ± 0.30
C2	28.70 ± 0.50
D	Typical 2.54
D1	1.47 (MAX)
D2	0.80 ± 0.20
E	2.55 ± 0.25
E1	0.70 ± 0.25
E2	$1.0 \times 45^\circ$
E3	0.50 ± 0.20
E4	2.75 ± 0.30

(Unit:mm)

外形尺寸:

Package Dimension:

TO-3PN



(Units: mm)