



N 沟道增强型场效应晶体管

N-CHANNEL MOSFET

FHP15N65A /FHF15N65A

主要参数 MAIN CHARACTERISTICS

ID	15A
VDSS	650V
Rdson-typ (@Vgs=10V)	0.46Ω
Qg-typ	50nC

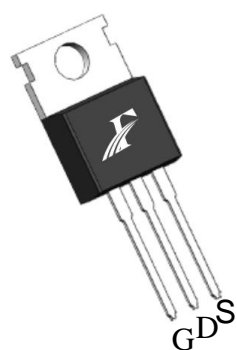
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 16pF)	Low Crss (typical 16pF)
开关速度快	Fast switching
100%经过雪崩测试	100% avalanche tested
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

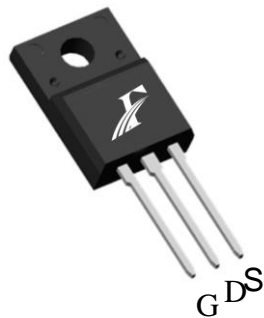
用途 APPLICATIONS

高频开关电源	High efficiency switch mode power supplies
LED 电源	LED power supply

封装形式 Package

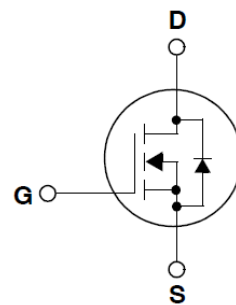


TO-220
FHP series



TO-220F
FHF series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
		FHP15N65A	FHF15N65A	
最高漏极-源极直流电压 Drain-Source Voltage	VDS	650		V
连续漏极电流* Drain Current -continuous *	ID (TC=25°C)	15*		A
	ID (TC=100°C)	10*		A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	IDM	60*		A
最高栅源电压 Gate-Source Voltage	VGS	±30		V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	EAS	700		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	IAR	4.5		A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	EAR	100		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		V/ns
耗散功率 Power Dissipation	PD (TC=25°C)	180	55	W
	-Derate above 25°C	1.44	0.44	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	TJ, TSTG	150, -55 to 150		°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	TL	300		°C

*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	BVDSS	ID=250μA, VGS=0V	650	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBVDSS/ΔTJ	ID=250μA, referenced to 25°C	-	0.74	-	V/°C
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	IDSS	VDS=650V, VGS=0V, TC=25°C	-	-	1	μA
		VDS=520V, TC=125°C	-	-	100	μA
栅极体漏电流 Gate-body leakage current	IGSS (F/R)	VDS=0V, VGS =±30V	-	-	±100	μA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	VGS(th)	VDS = VGS, ID=250μA	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	RDS(ON)	VGS =10V, ID=7.5A	-	0.46	0.60	Ω
动态特性 Dynamic Characteristics						
正向跨导 Forward Trans conductance	gfs	VDS=15V, ID =7.5A		11.5		S
输入电容 Input capacitance	Ciss	VDS=25V, VGS =0V, f=1.0MHz	-	2050	-	pF
输出电容 Output capacitance	Coss		-	183	-	
反向传输电容 Reverse transfer capacitance	Crss		-	16	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	td(on)	VDS=325V, ID=15A, RG=10Ω (note 4, 5)	-	16	-	ns
上升时间 Turn-On rise time	tr		-	20	-	ns
延迟时间 Turn-Off delay time	td(off)		-	46	-	ns
下降时间 Turn-Off Fall time	tf		-	22	-	ns
栅极电荷总量 Total Gate Charge	Qg	VDS =325V , ID=15A , VGS =10V (note 4, 5)	-	50	-	nC
栅-源电荷 Gate-Source charge	Qgs		-	7.5	-	nC
栅-漏电荷 Gate-Drain charge	Qgd		-	24	-	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		IS	-	-	15	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		ISM	-	-	60	A
正向压降 Drain-Source Diode Forward Voltage	VSD	VGS=0V, IS=7.5A	-	-	1.5	V
反向恢复时间 Reverse recovery time	trr	VGS=0V, IS=7.5A, dIF/dt=100A/μs (note 4)	-	360	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	2.9	-	μC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP15N65A	FHF15N65A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.5	1.7	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	100	°C/W

注释:
Notes:

- 1: 脉冲宽度由最高结温限制
- 2: L=10mH, IAS=11.8A, VDD=48V, RG=25 Ω, 起始结温 TJ=25°C
- 3: ISD ≤15A, di/dt ≤100A/μs, VDD≤BVDS, 起始结温 TJ=25°C
- 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=11.8A, VDD=48V, RG=25 Ω, 起始结温 TJ=25°C
- 3: ISD ≤15A, di/dt ≤100A/μs, VDD≤BVDS, Starting TJ=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle≤2%
- 5: Essentially independent of operating temperatur

特性曲线

ELECTRICAL CHARACTERISTICS (curves)

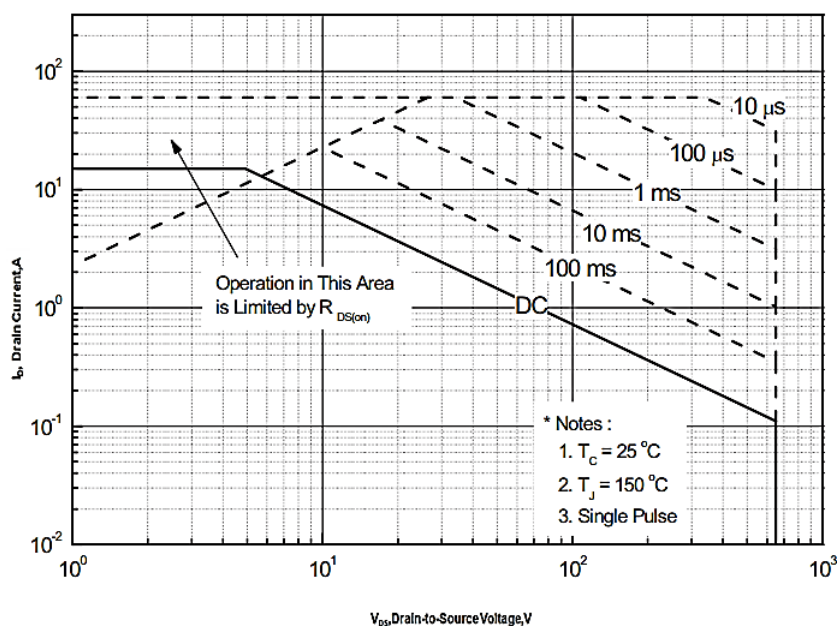


Figure 1 Maximum Forward Bias Safe Operating Area

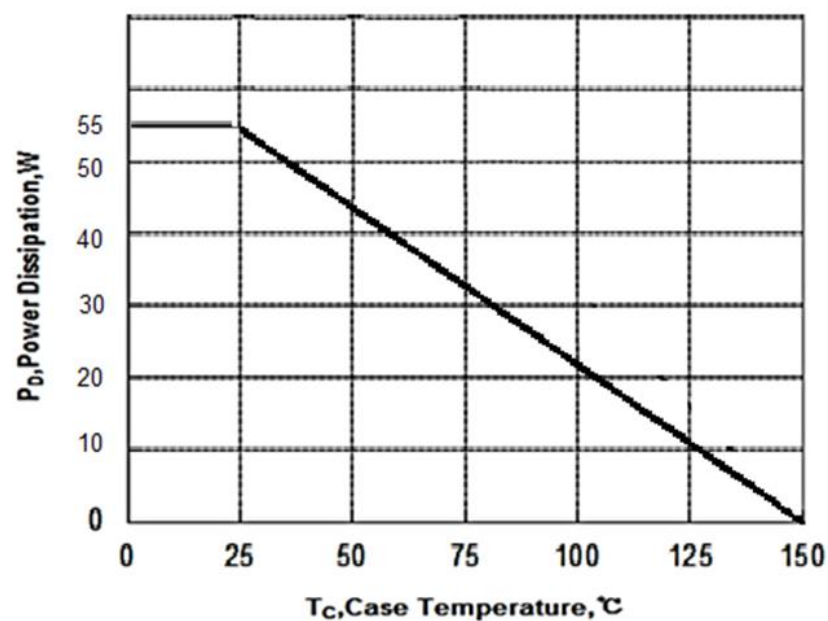


Figure 2 Maximum Power dissipation vs Case Temperature

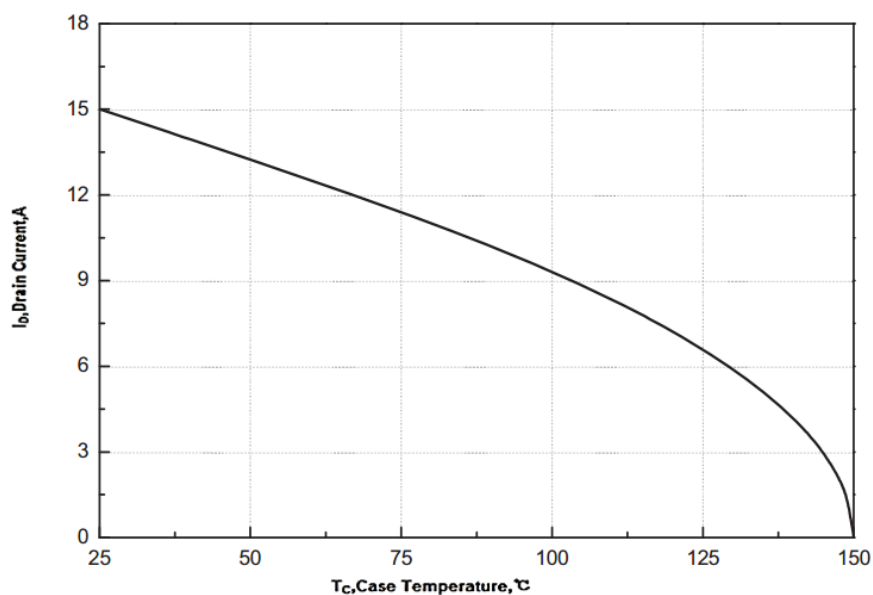


Figure 3 Maximum Continuous Drain Current vs Case Temperature

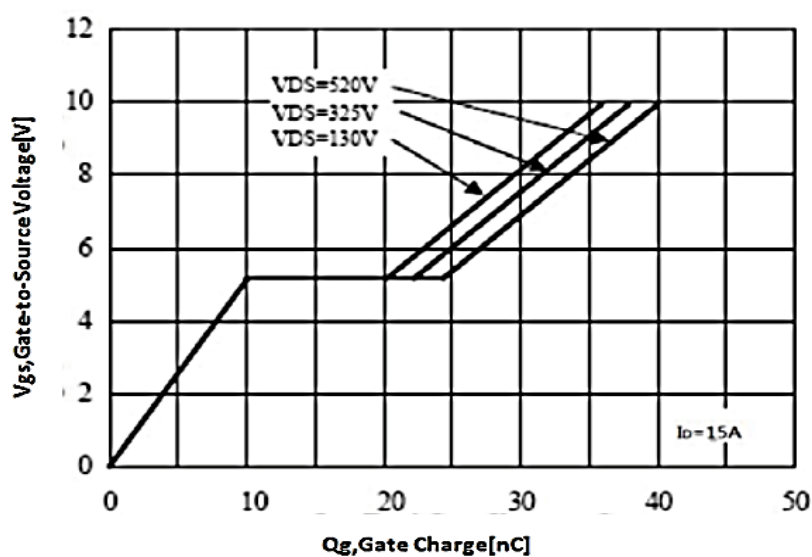


Figure 4 Typical Gate Charge vs Gate to Source Voltage

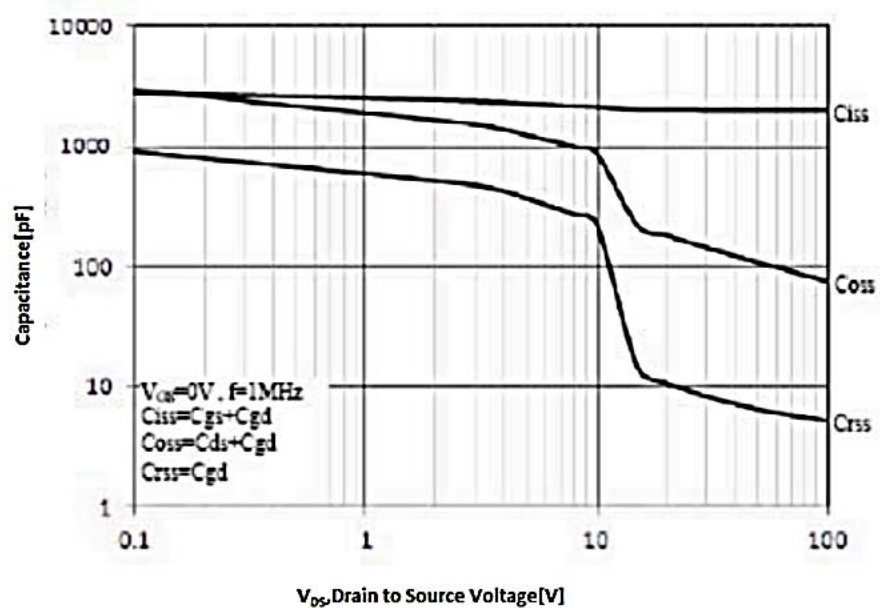


Figure 5 Typical Capacitance vs Drain to Source Voltage

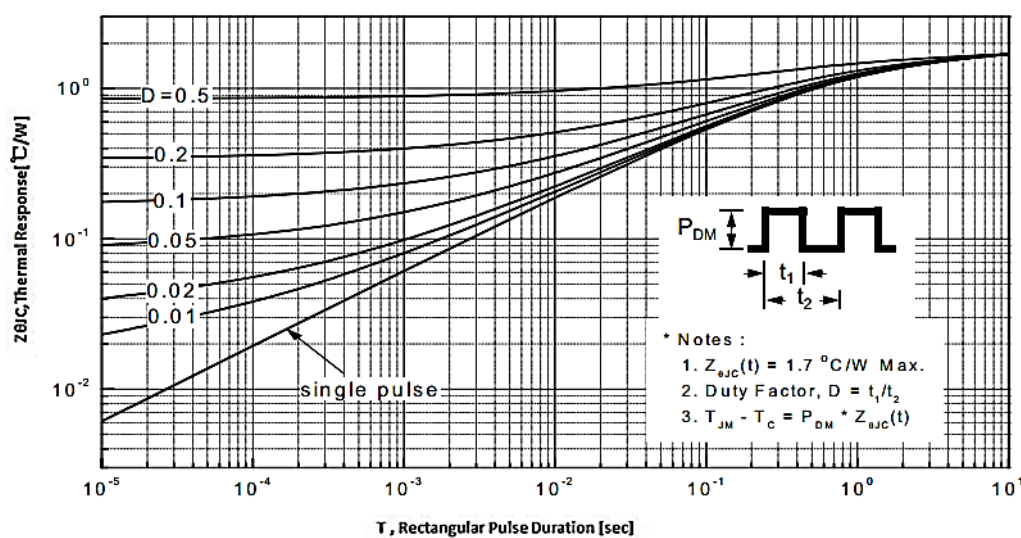
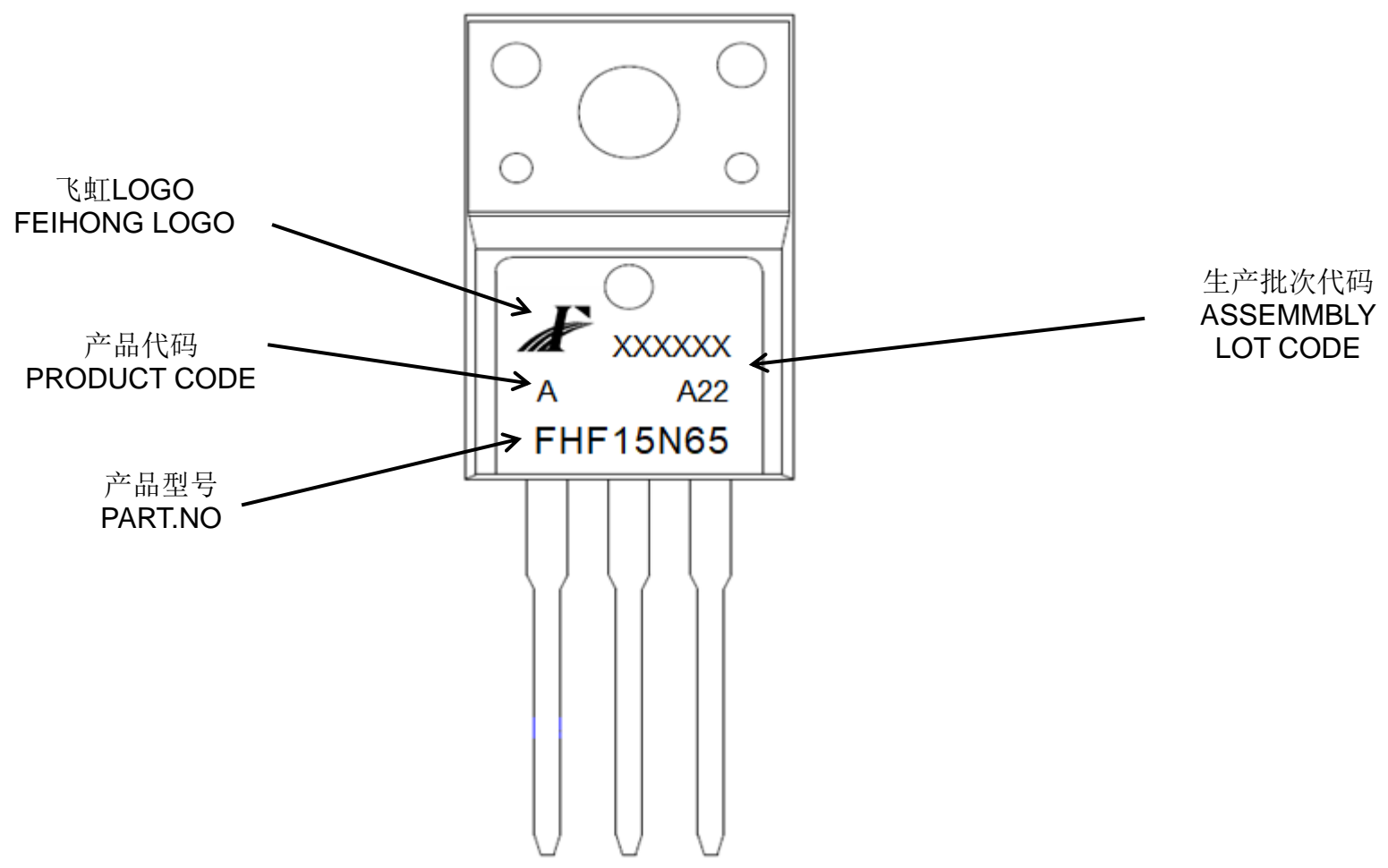
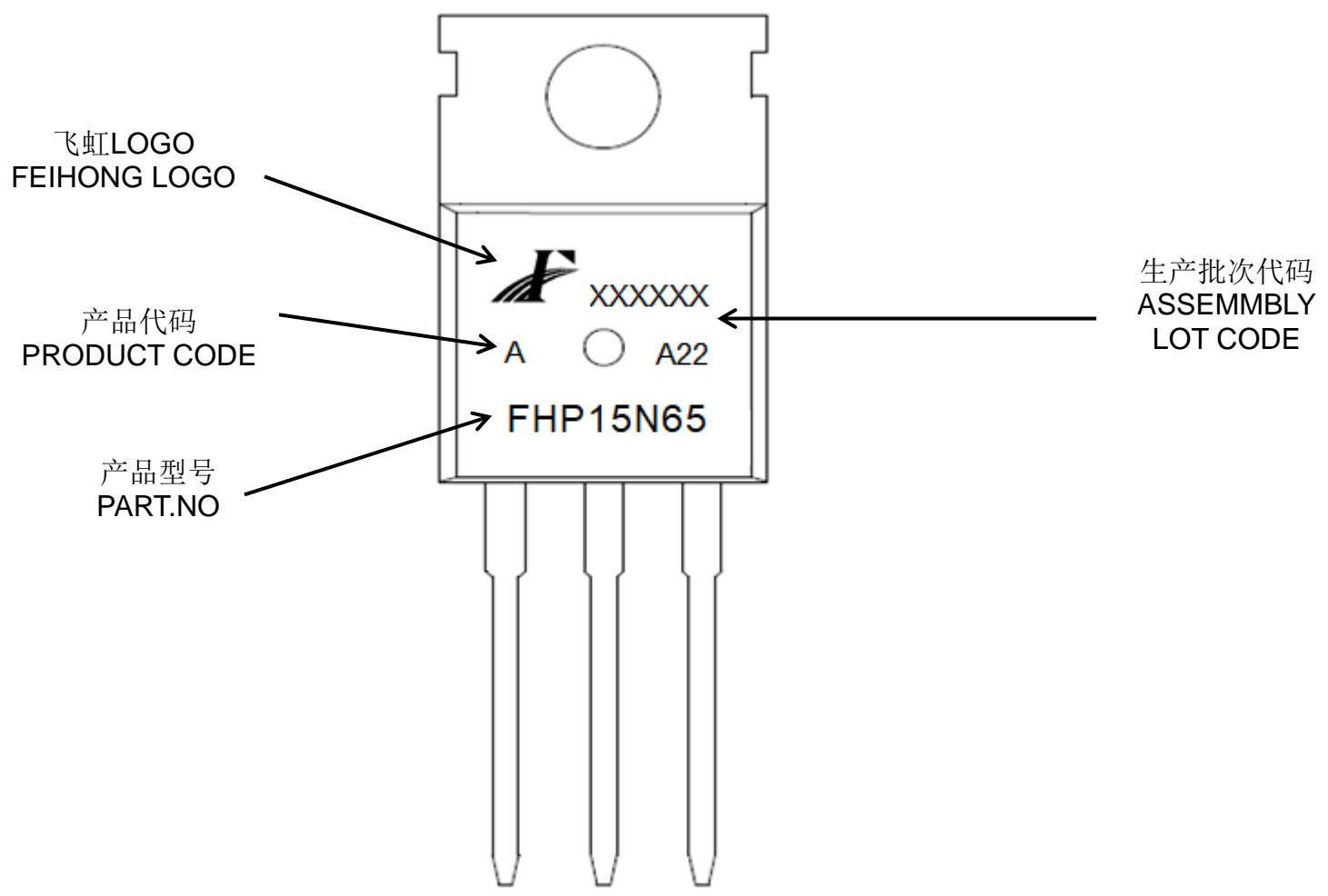


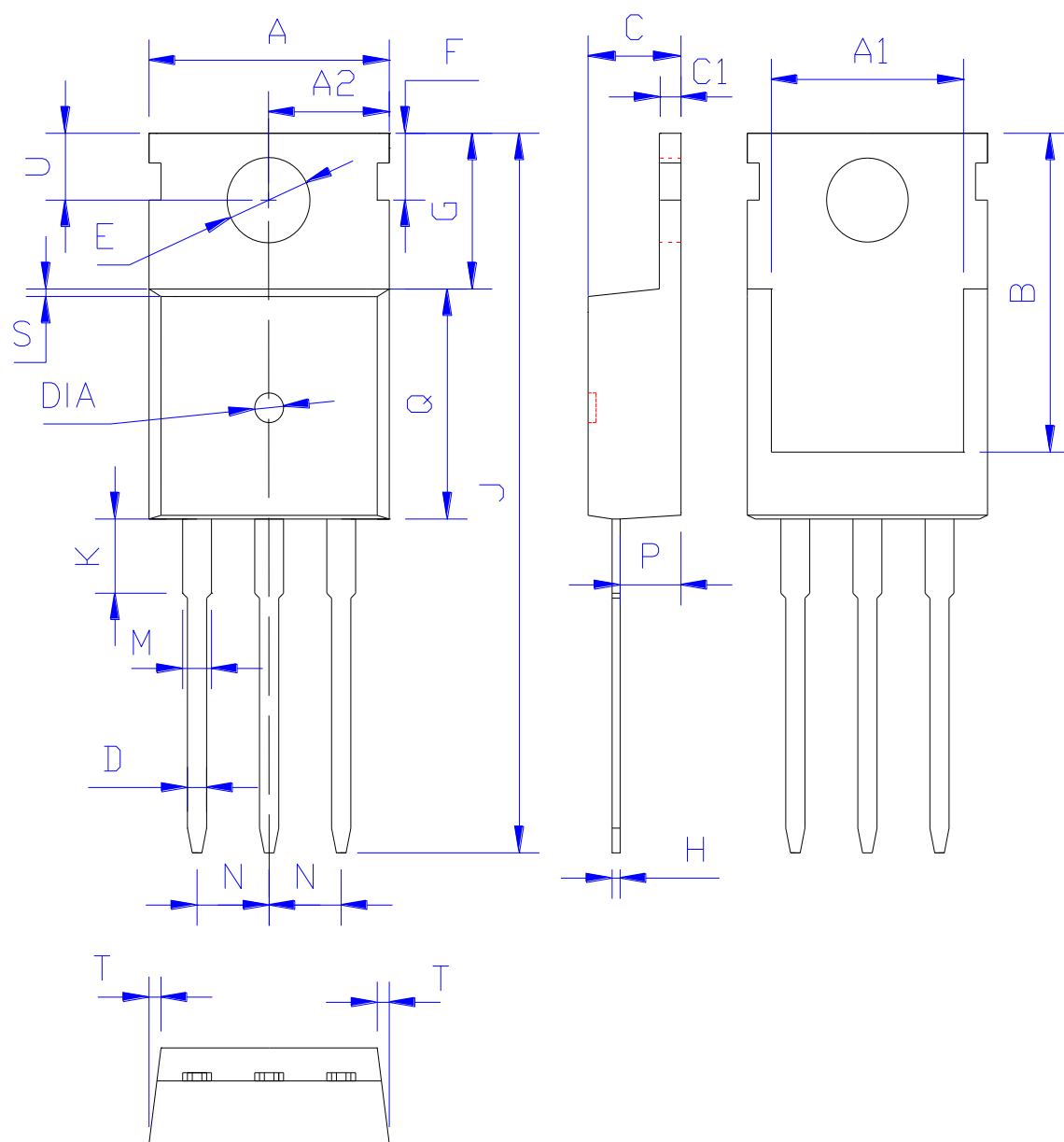
Figure 6 Maximum Effective Thermal Impedance, Junction to Case

印记 Marking:



外形尺寸:
Package Dimension:

TO-220

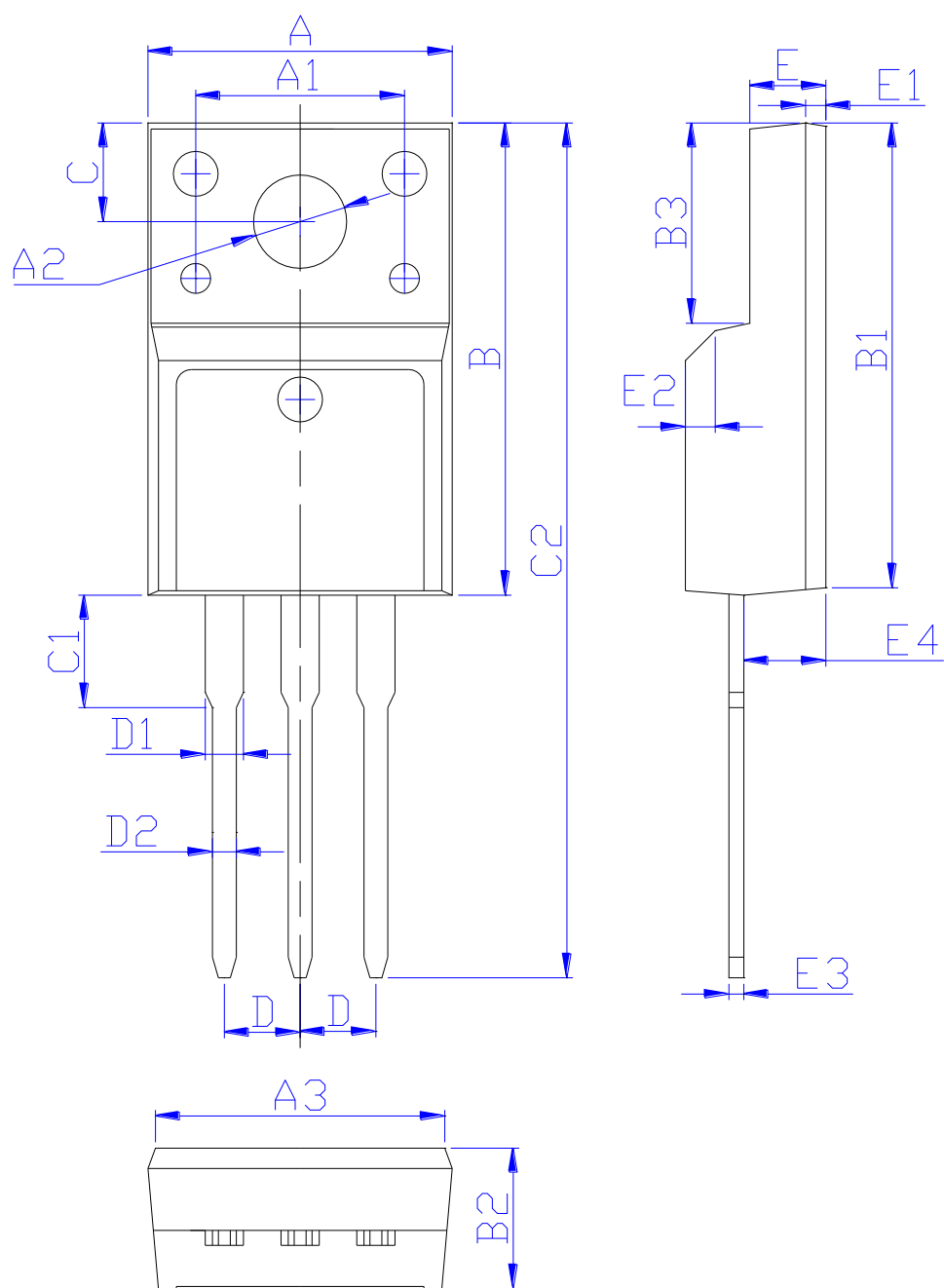


DIM	MILLIMETERS
A	10.00±0.30
A1	8.00±0.30
A2	5.00±0.30
B	13.20±0.40
C	4.50±0.20
C1	1.30±0.20
D	0.80±0.20
E	3.60±0.20
F	3.00±0.30
G	6.60±0.40
H	0.50±0.20
J	28.88±0.50
K	3.00±0.30
M	1.30±0.30
N	Typical 2.54
P	2.40±0.40
Q	9.20±0.40
S	0.25±0.15
T	0.25±0.15
U	2.80±0.30
DIA	宽 1.50±0.10 深 0.50 MAX

(Unit: mm)

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	1.0×45°
E3	0.50±0.20
E4	2.75±0.30

(Unit: mm)