N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
FHP830C/FHF830C/FHD830C

主要参数 MAIN CHARACTERISTICS

ID	5A
VDSS	500 V
Rdson-typ（ @Vgs=10V）	1.51Ω
Qg-typ	16.8nC

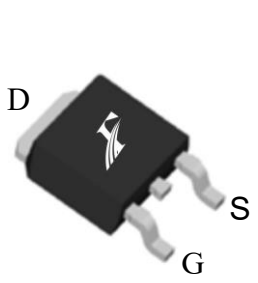
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 2.45pF)	Low Crss (typical 2.45pF)
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
高抗 dv/dt 能力	Improved dv/dt capability
RoHS 产品	RoHS product

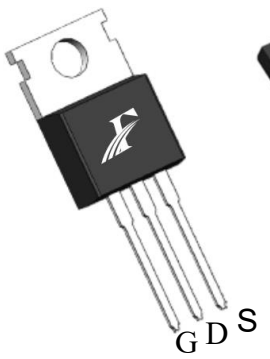
用途 APPLICATIONS

高频开关电源	High efficiency switch mode power supplies
电机驱动	Motor Drive
逆变电源	Power management for inverter systems

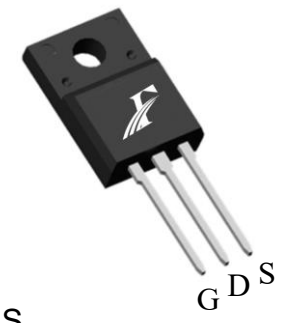
封装形式 Package



TO-252
FHD series

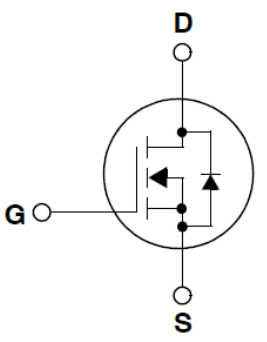


TO-220
FHP series



TO-220F
FHF series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc25℃)

项目 **Parameter**	符号 **Symbol**	数值 **Value**		单位 **Unit**
		FHP/D830C	FHF830C	
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℃）	5		A
	I_D（T_C=100℃)	3.5		A
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I_{DM}	20		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}	101.25		mJ
雪崩电流（注 1） Avalanche Current（note 1）	I_{AS}	4.5		A
重复雪崩能量（注 1） Repetitive Avalanche Current（note 1）	E_{AR}	15		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℃）	78	30	W
	-Derate above 25℃	0.62	0.24	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	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℃	-	-	1	μA
		V_{DS}=400V, T_C=125℃	-	-	100	μA
栅极体漏电流 Gate-body leakage current	I_{GSS}（F/R）	V_{DS}=0V, V_{GS} =±30V	-	-	±100	nA
通态特性 **On-Characteristics**						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = VGS , 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=2.5A	-	1.51	1.60	Ω
正向跨导 Forward Transconductance	gfs	V_{DS} = 15V, I_D=2.5A（note 4）	-	3.5	-	S
动态特性 **Dynamic Characteristics**						
栅电阻 Gate Resistance	Rg	f=1.0MHz,V_{DS} OPEN	-	2.0	-	Ω
输入电容 Input capacitance	Ciss	V_{DS}=25V, V_{GS} =0V, f=1.0MHz	-	674	-	pF
输出电容 Output capacitance	Coss		-	65	-	
反向传输电容 Reverse transfer capacitance	Crss		-	2.45	-	
开关特性 **Switching Characteristics**						
延迟时间 Turn-On delay time	td(on)	V_{DS}=250V, I_D=5A, R_G=5Ω V_{GS} =10V （note 4，5）	-	13	-	ns
上升时间 Turn-On rise time	tr		-	45	-	ns
延迟时间 Turn-Off delay time	td(off)		-	50	-	ns
下降时间 Turn-Off Fall time	tf		-	49	-	ns
栅极电荷总量 Total Gate Charge	Qg	V_{DS} =400V , I_D=5A , V_{GS} =10V （note 4，5）	-	16.8	-	nC
栅－源电荷 Gate-Source charge	Qgs		-	5.5	-	nC
栅－漏电荷 Gate-Drain charge	Qgd		-	4.3	-	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		-	-	5	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	20	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=5A	-	-	1.2	V
反向恢复时间 Reverse recovery time	trr	V_{GS}=0V, I_S=5A ,dI_F/dt=100A/μs (note 4)	-	264	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	1.95	-	μC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP/D830C	FHF830C	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	1.60	4.17	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	60	62.5	℃/W

注释：
1：脉冲宽度由最高结温限制
2：L=10mH, I_{AS}=4.5A, V_{DD}=50V, R_G=25 Ω,起始结温 T_J=25℃
3：I_{SD} ≤5A,di/dt ≤100A/μs,V_{DD}≤BV_{DSS},起始结温 T_J=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, I_{AS}=4.5A, V_{DD}=50V, R_G=25 Ω,Starting T_J=25℃
3：I_{SD} ≤5A,di/dt ≤100A/μs,V_{DD}≤BV_{DSS}, Starting T_J=25℃
4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%
5：Essentially independent of operating temperature

特性曲线　Typical Characteristics

Figure 1　Safe Operating Area

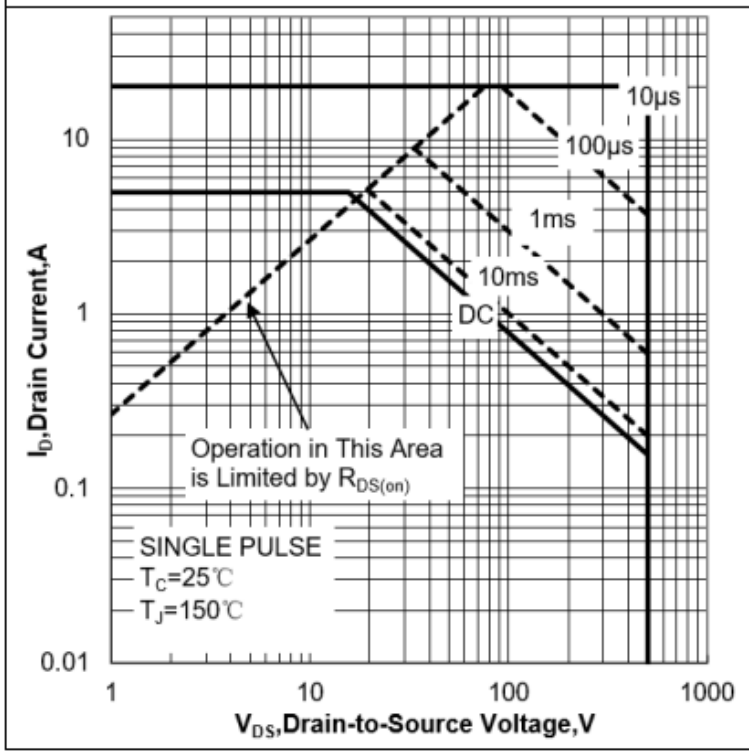


Figure 2　Power Dissipation

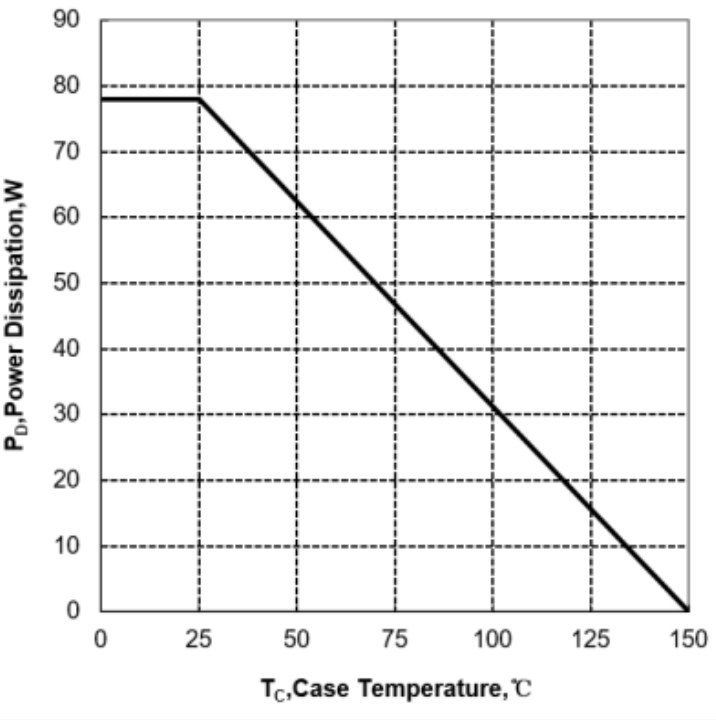


Figure 3 Typical Output Characteristics

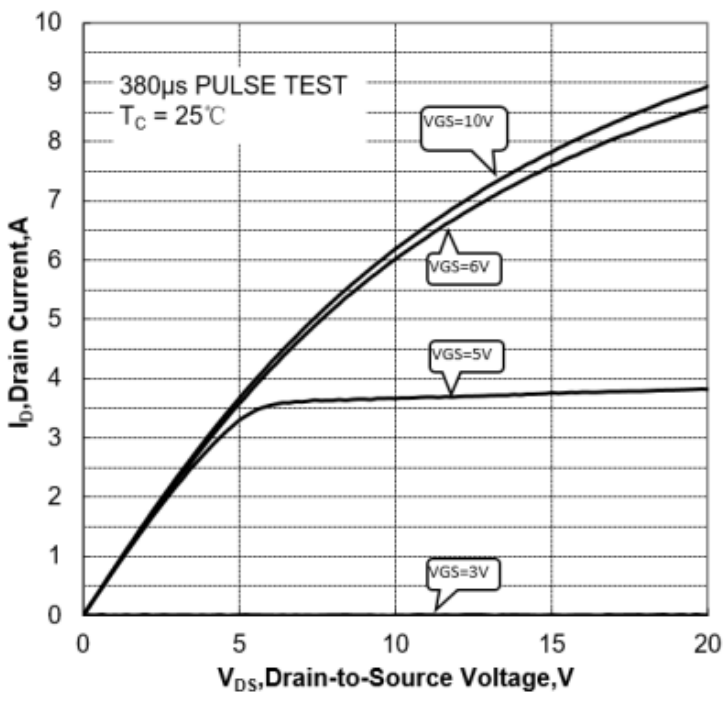


Figure 4 Typical Transfer Characteristics

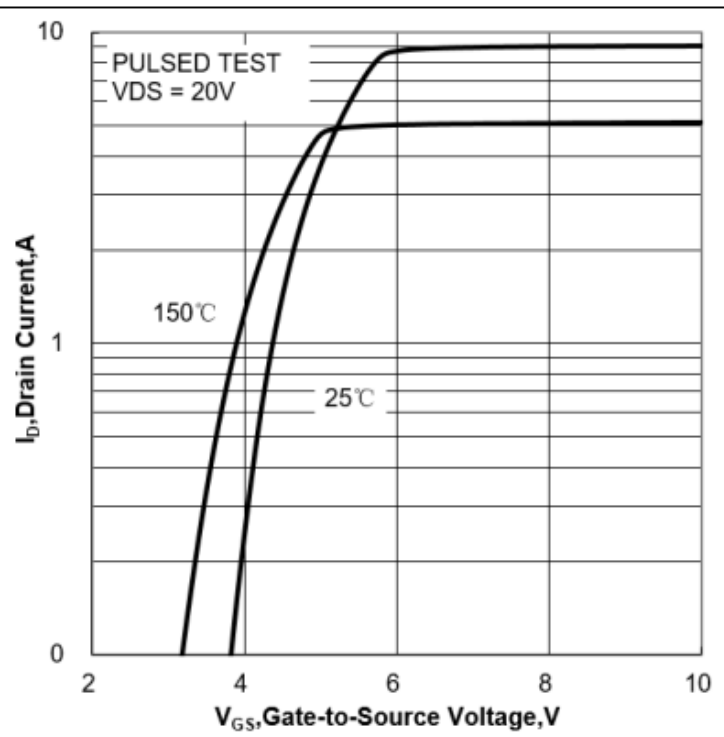


Figure 5 Typical Drain to Source ON Resistance vs Drain Current

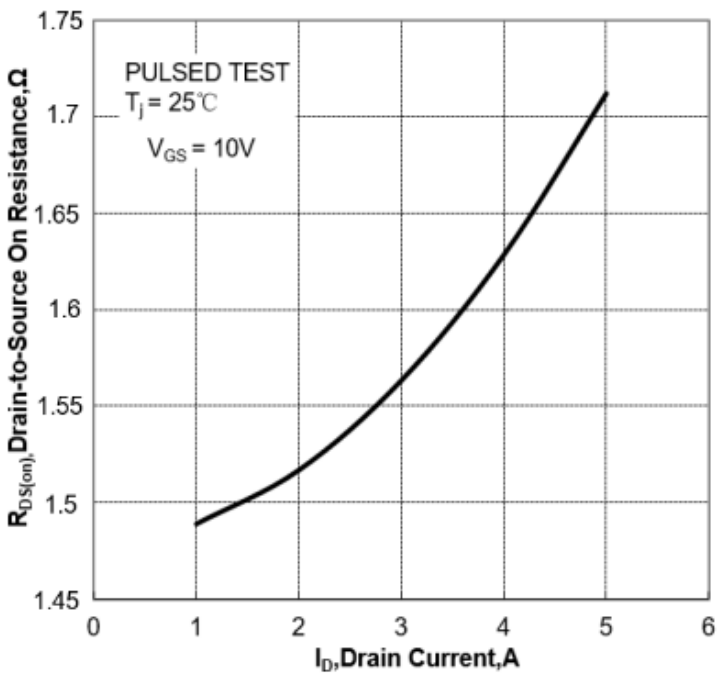


Figure 6 Typical Drian to Source on Resistance vs Junction Temperature

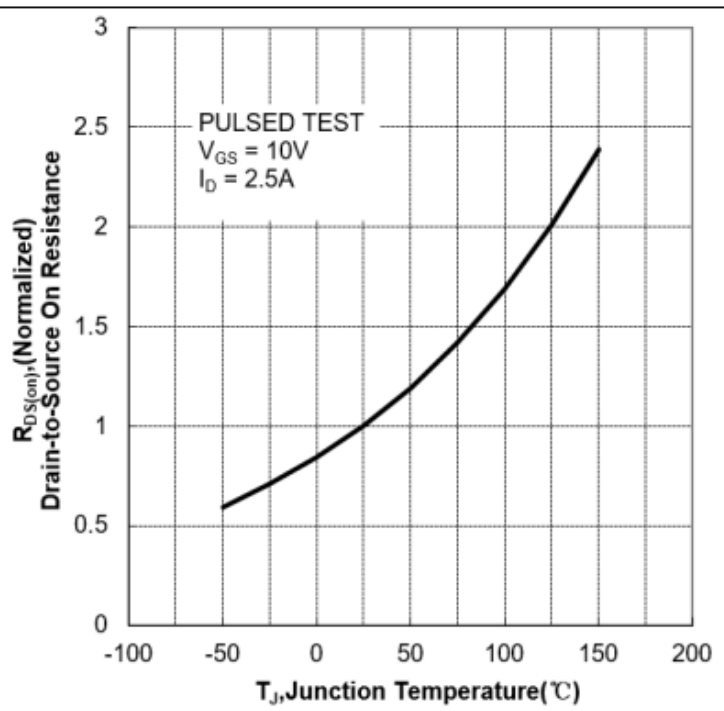


Figure 7 Typical Theshold Voltage vs Junction Temperature

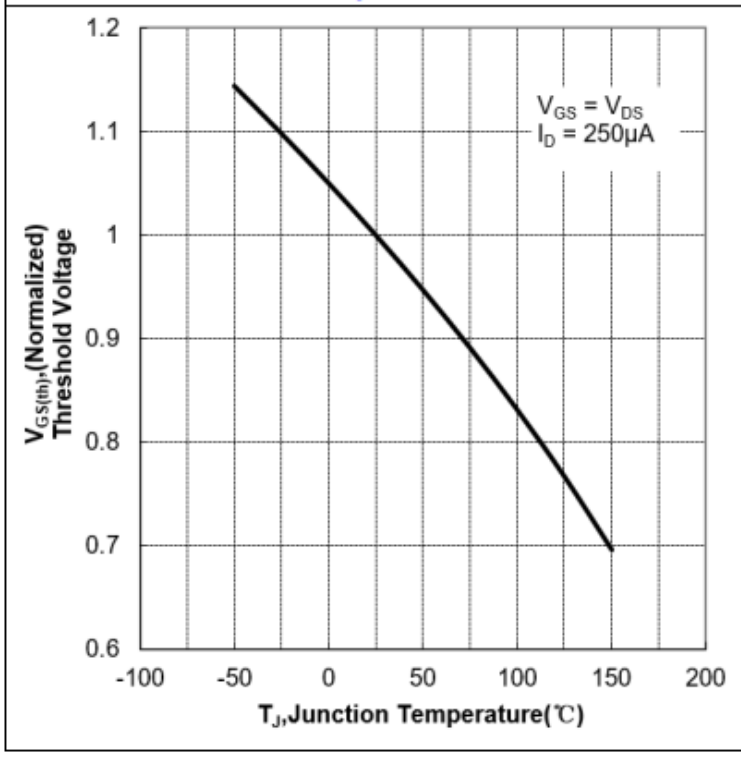


Figure 8 Typical Breakdown Voltage vs Junction Temperature

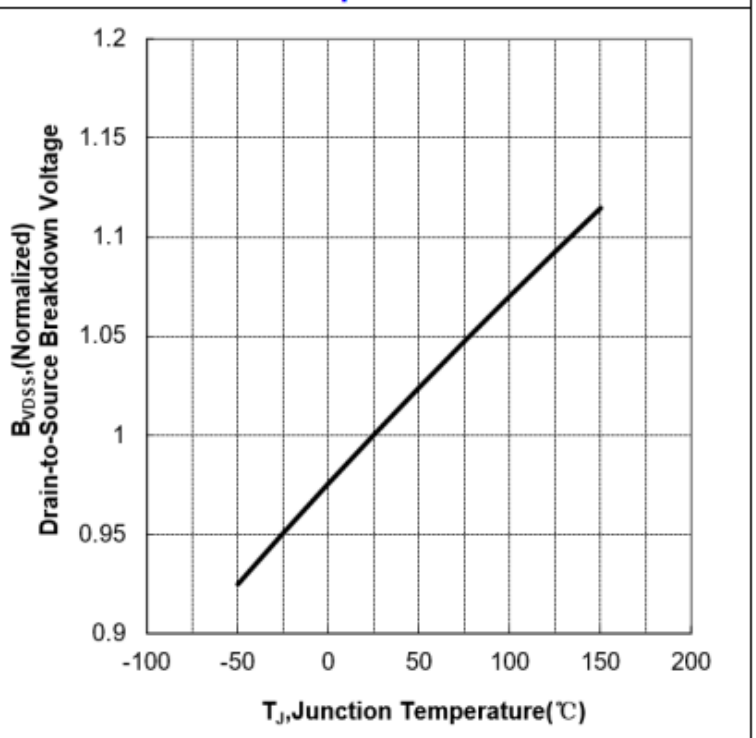


Figure 9 Typical Theshold Voltage vs Junction Temperature

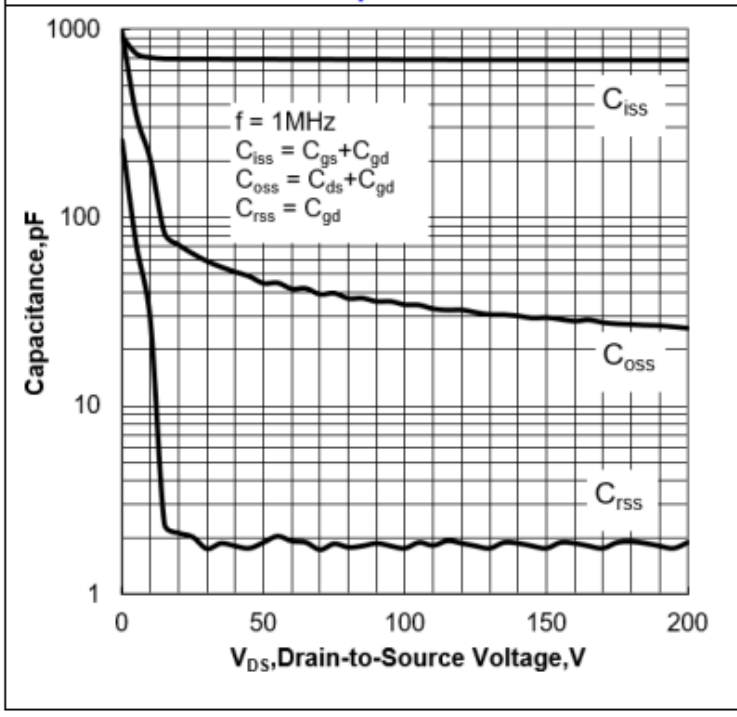


Figure 10 Typical Breakdown Voltage vs Junction Temperature

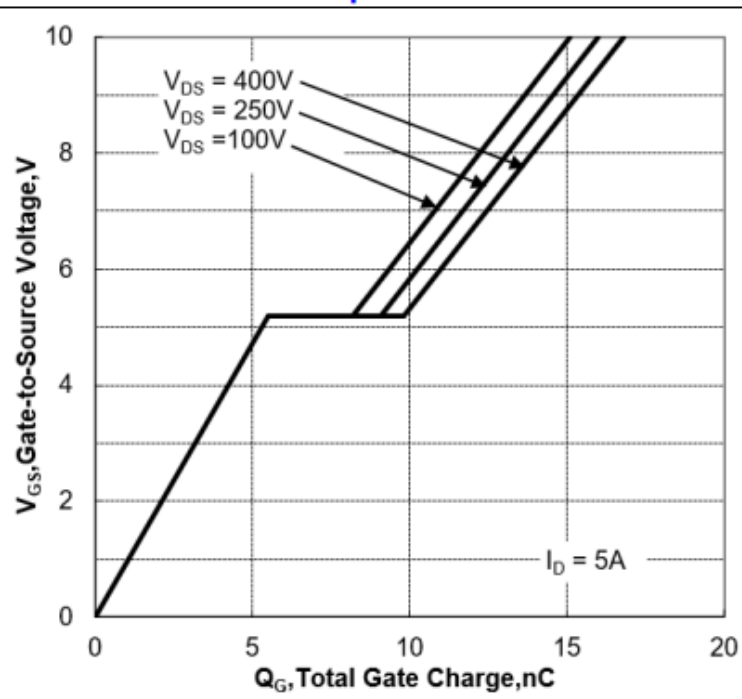
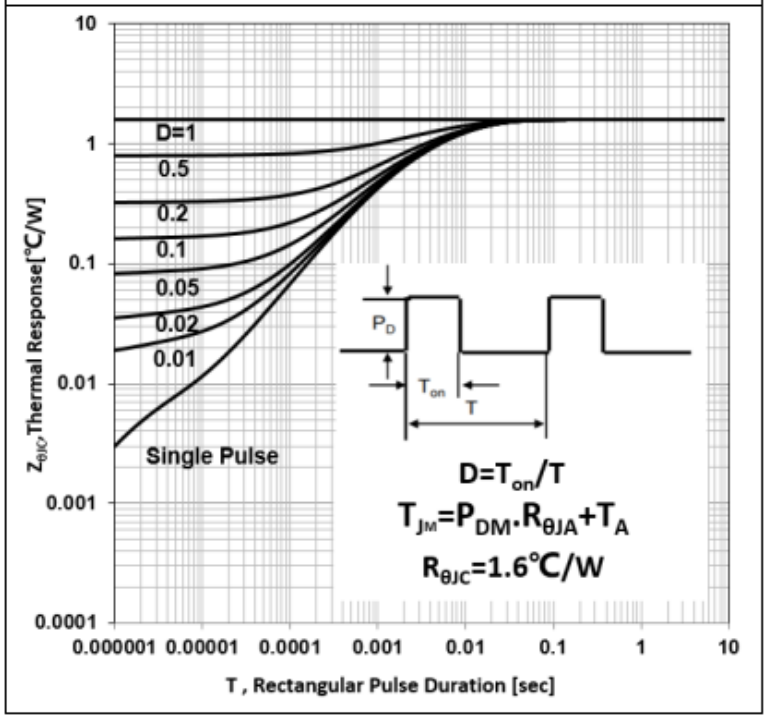
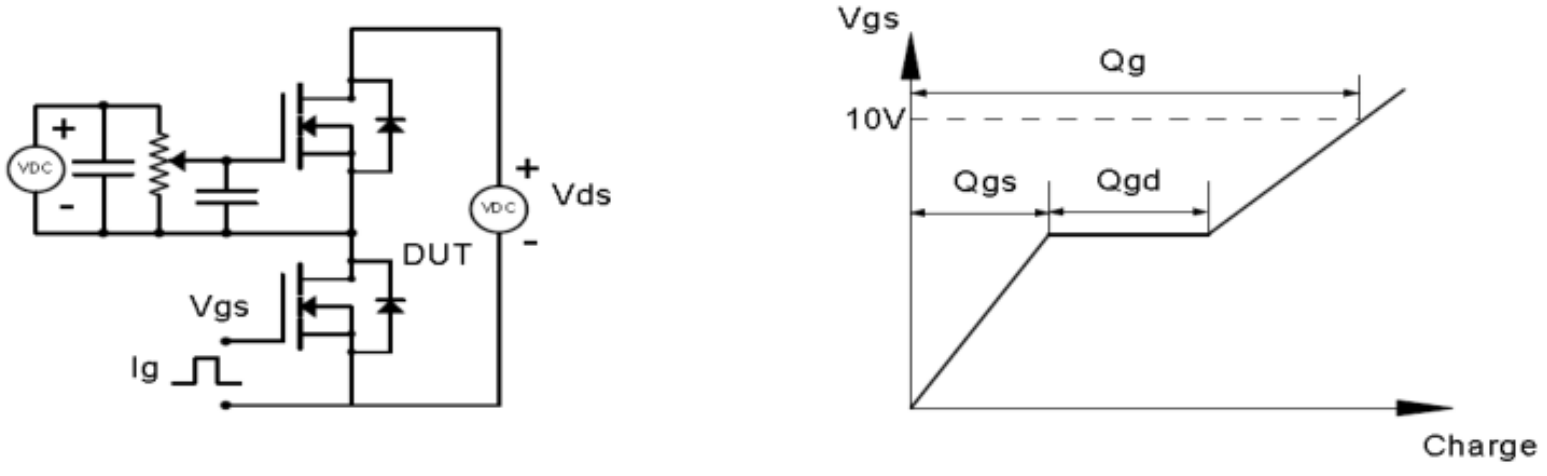


Figure 11 Max Thermal Impendance

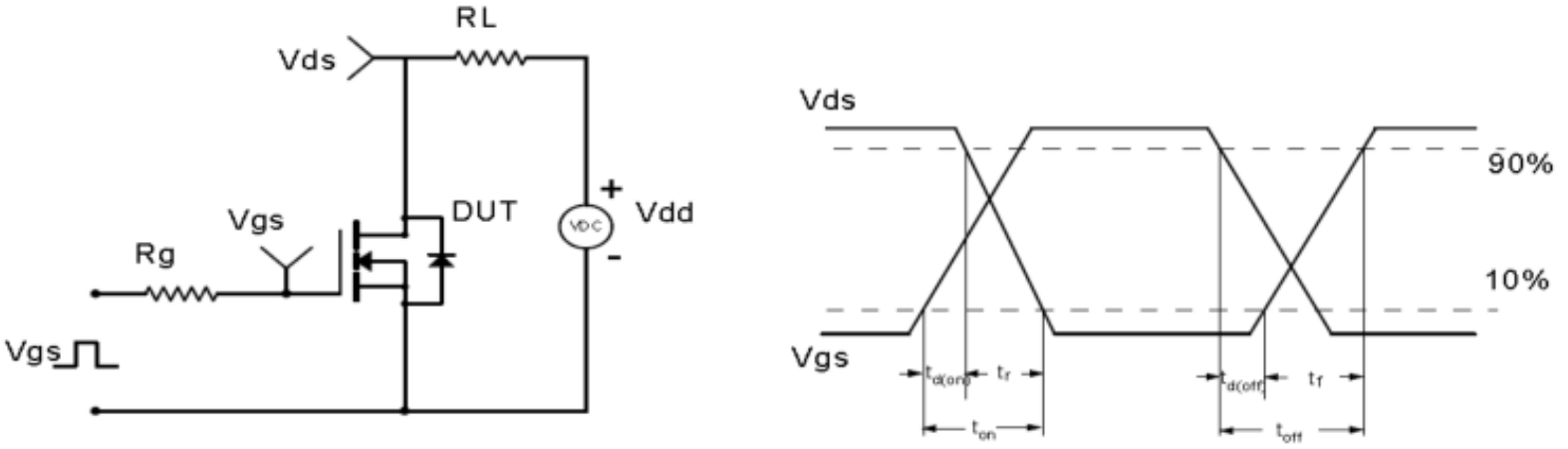


Test Circuit & Waveform

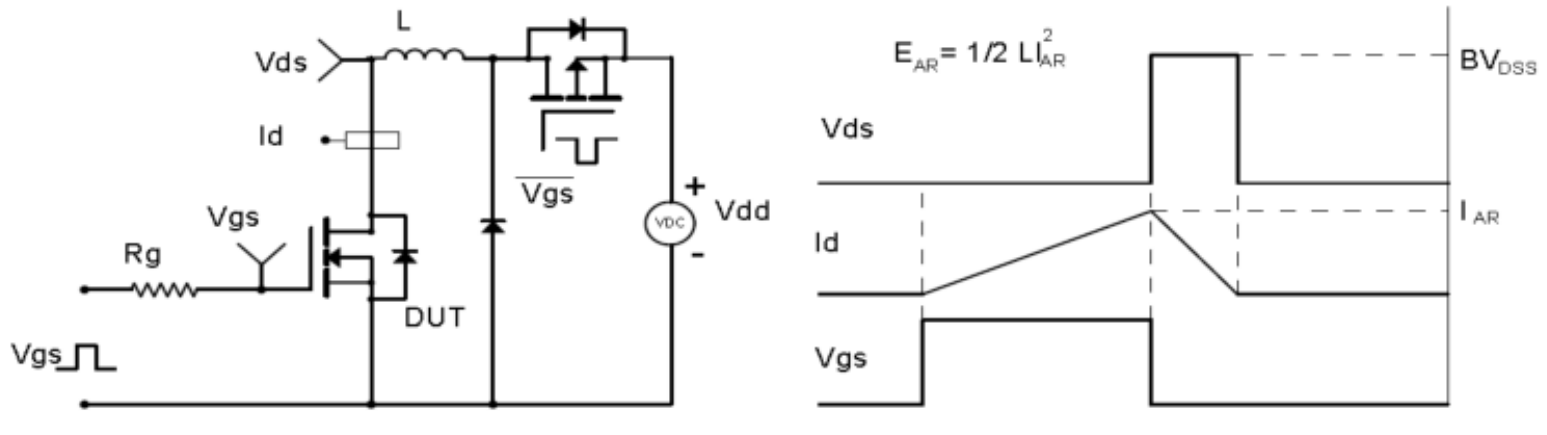
Gate Charge Test Circuit & Waveform



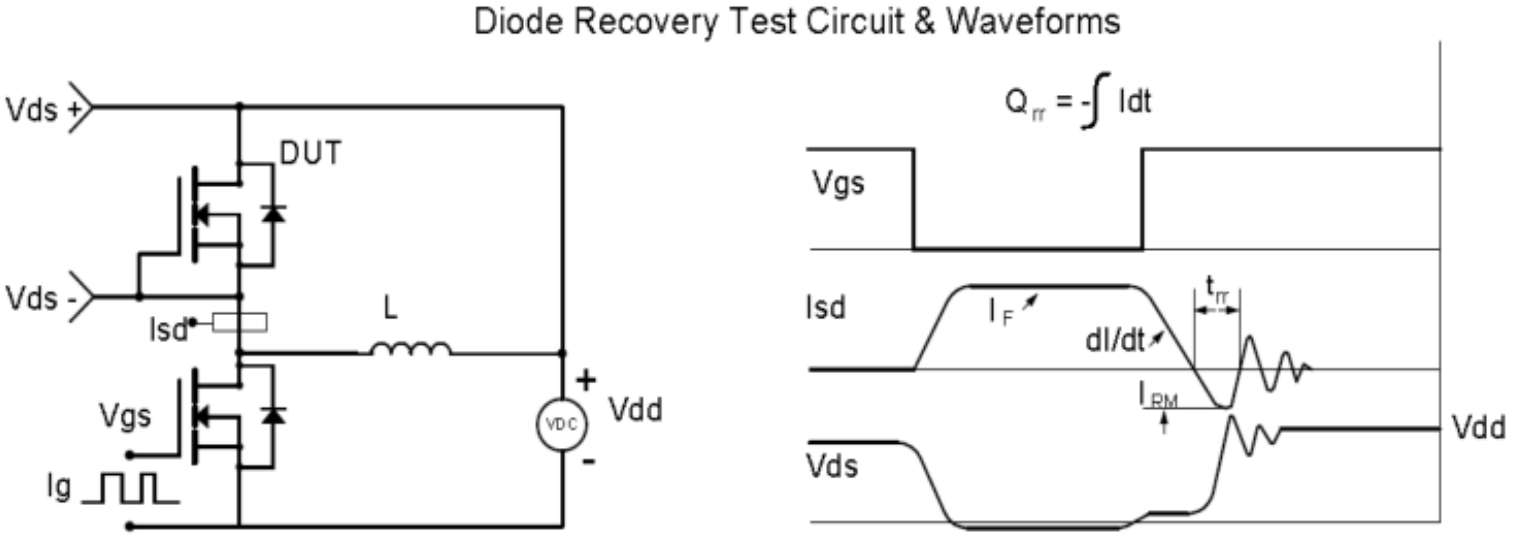
Resistive Switching Test Circuit & Waveforms



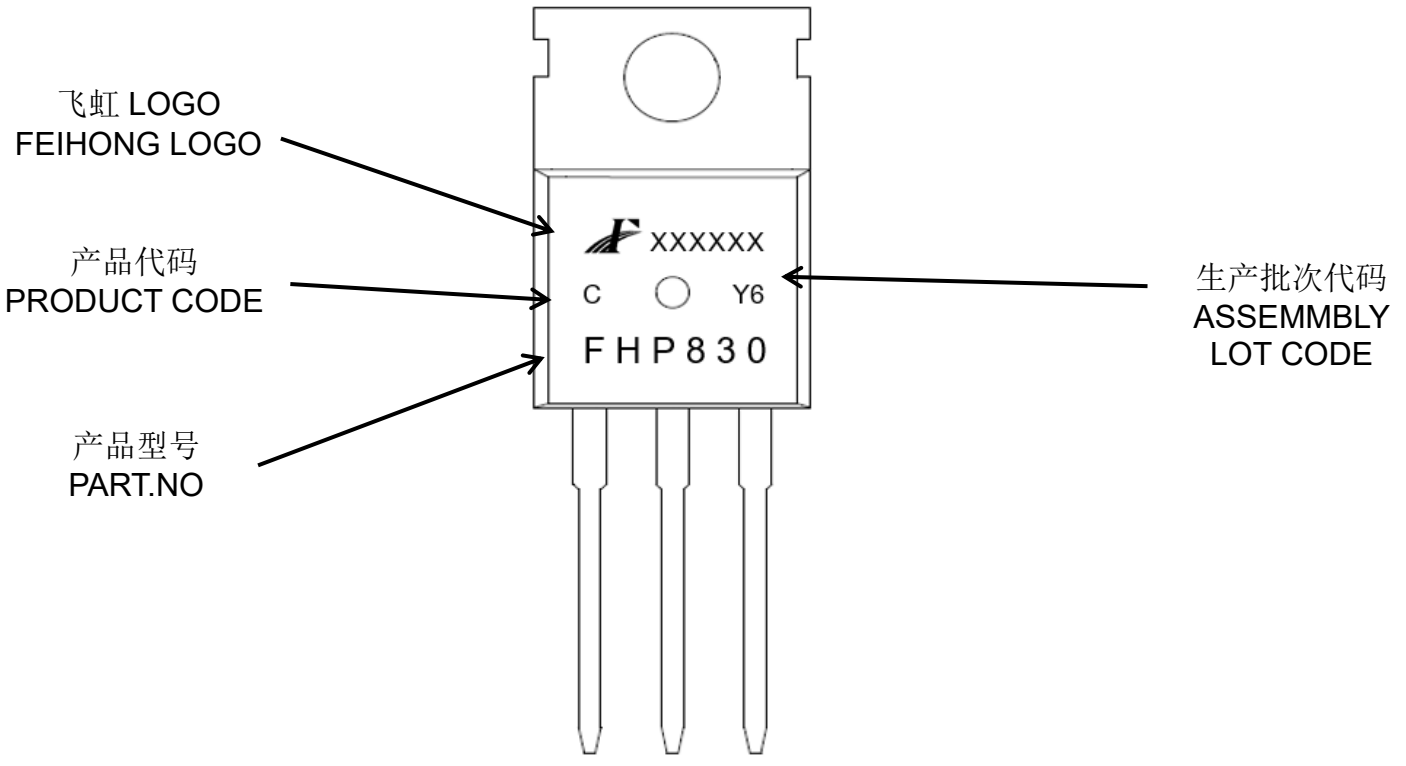
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



印记 Marking: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FEIHONG LOGO
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PRODUCT CODE
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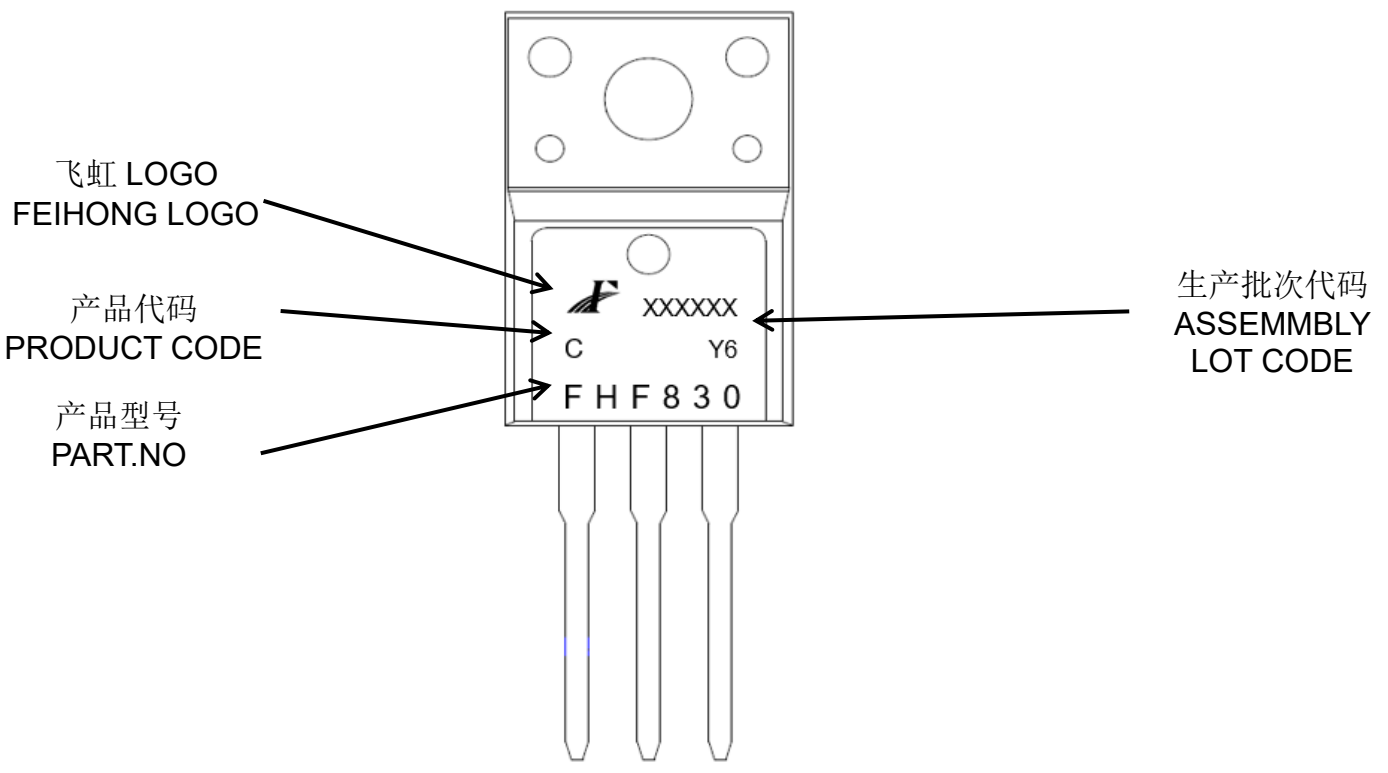
C
Y6
F H P 8 3 0
生产批次代码
ASSEMMBLY
LOT CODE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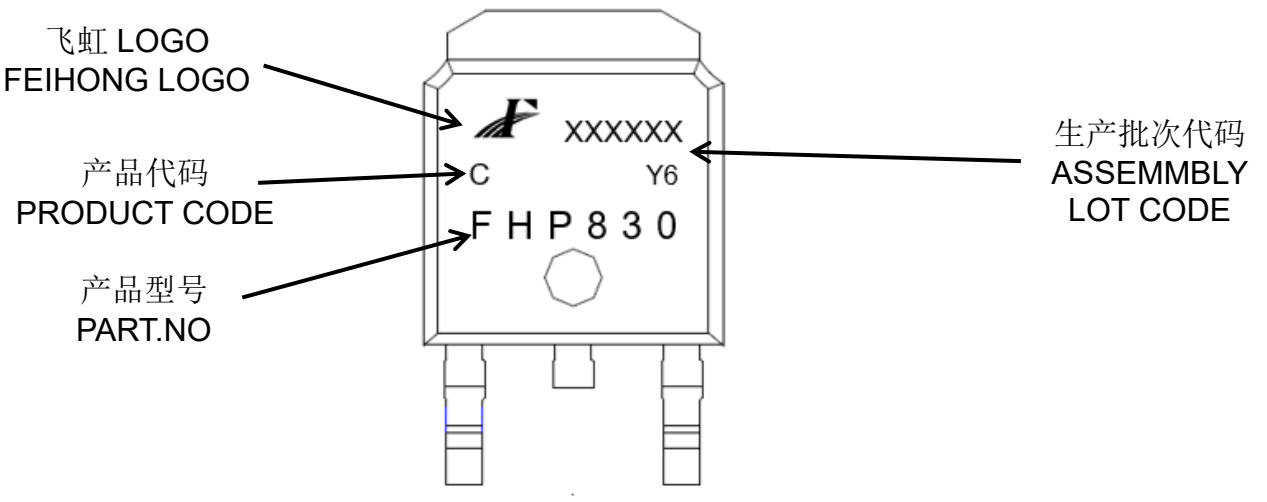
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Y6
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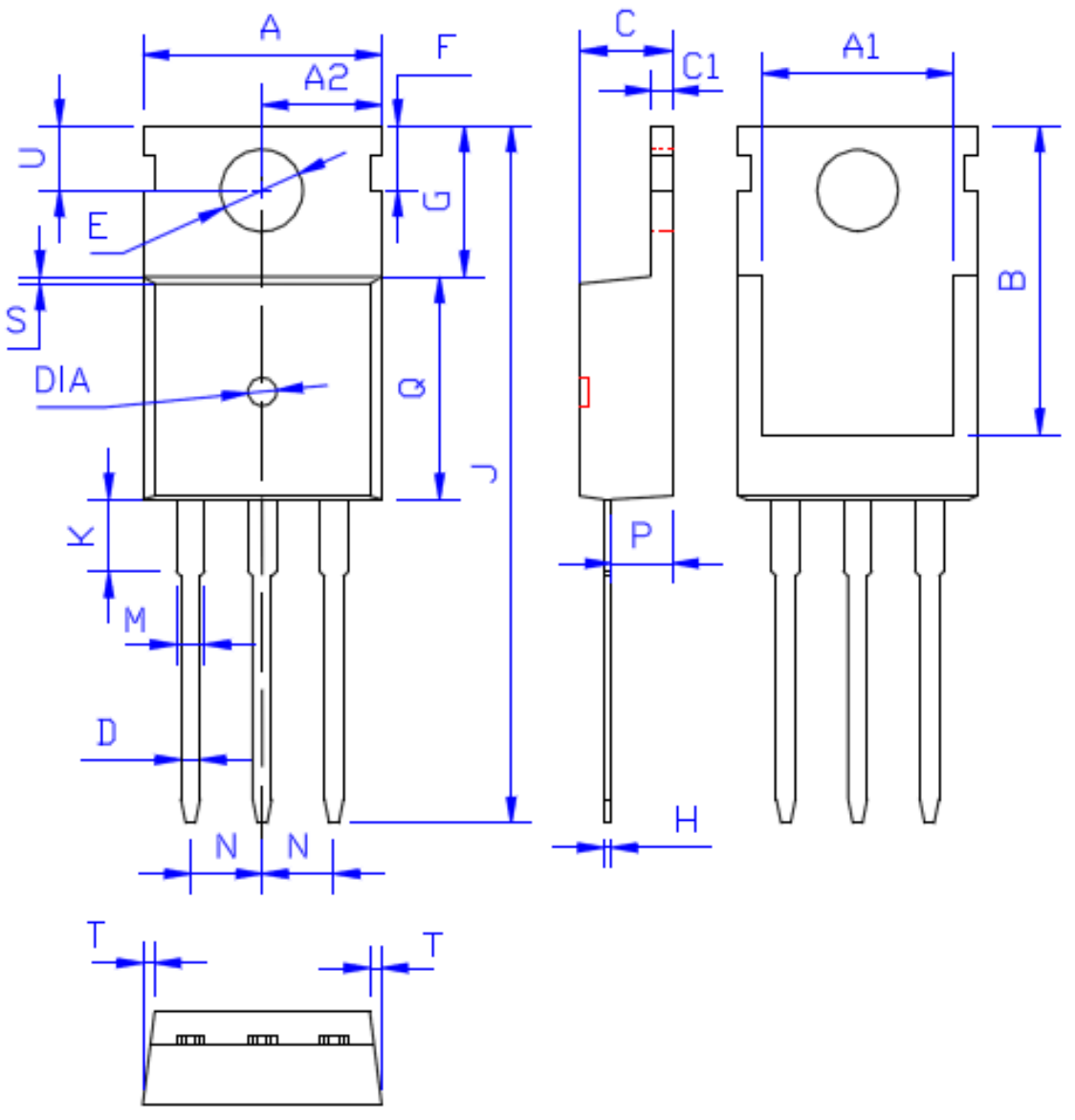
外形尺寸：

Package Dimension：

TO-220



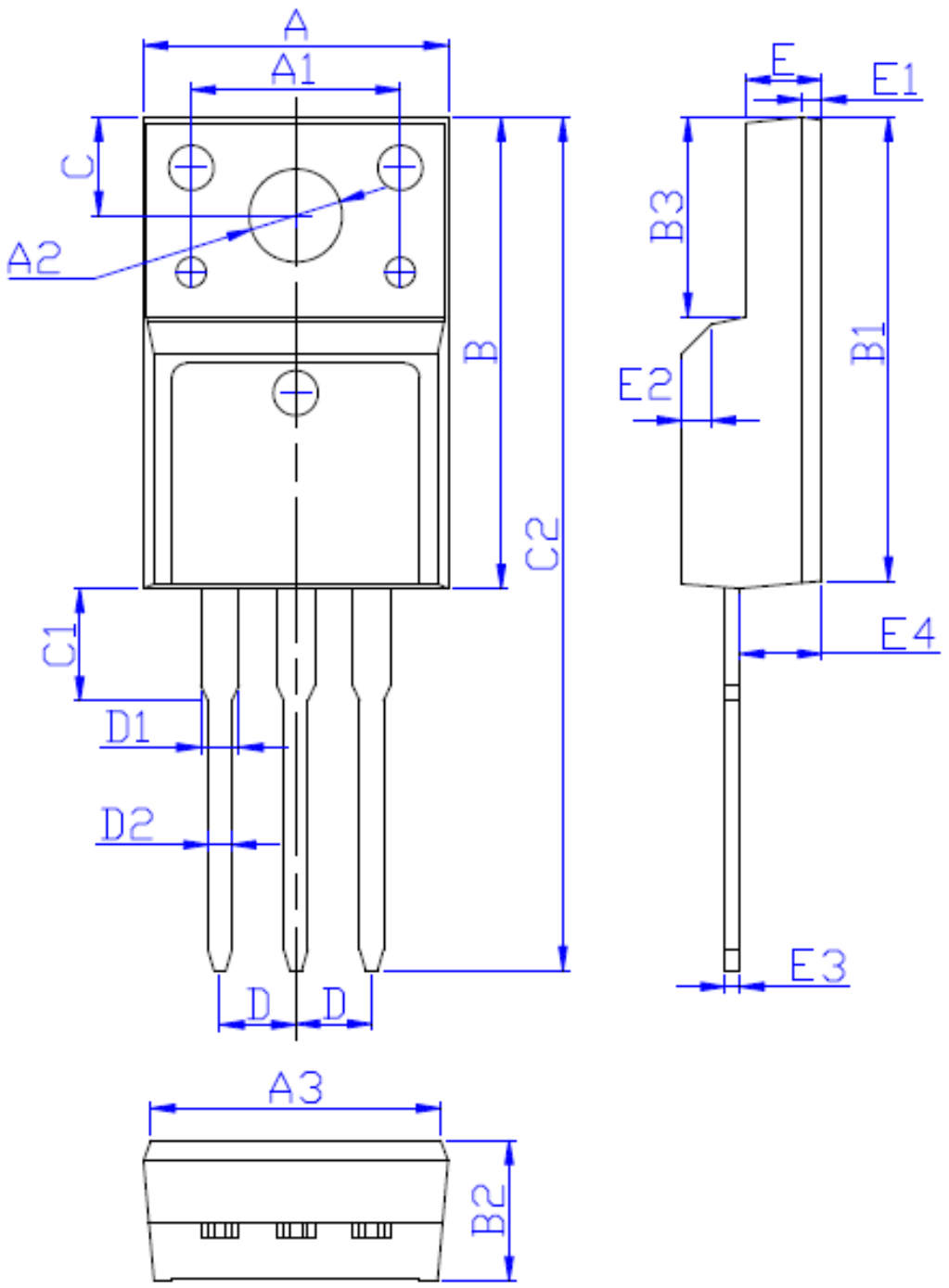
DIM	MILLIMETERS
A	10.00±0.30
A1	8.00±0.30
A2	5.00±0.30
B	13.20±0.40
C	4.50±0.20
C1	1.30±0.20
D	0.80±0.20
E	3.60±0.20
F	3.00±0.30
G	6.60±0.40
H	0.50±0.20
J	28.88±0.50
K	3.00±0.30
M	1.30±0.30
N	Typical 2.54
P	2.40±0.40
Q	9.20±0.40
S	0.25±0.15
T	0.25±0.15
U	2.80±0.30
DIA	宽 1.50±0.10 深 0.50 MAX

（Unit：mm）

外形尺寸：

Package Dimension：

TO-220F



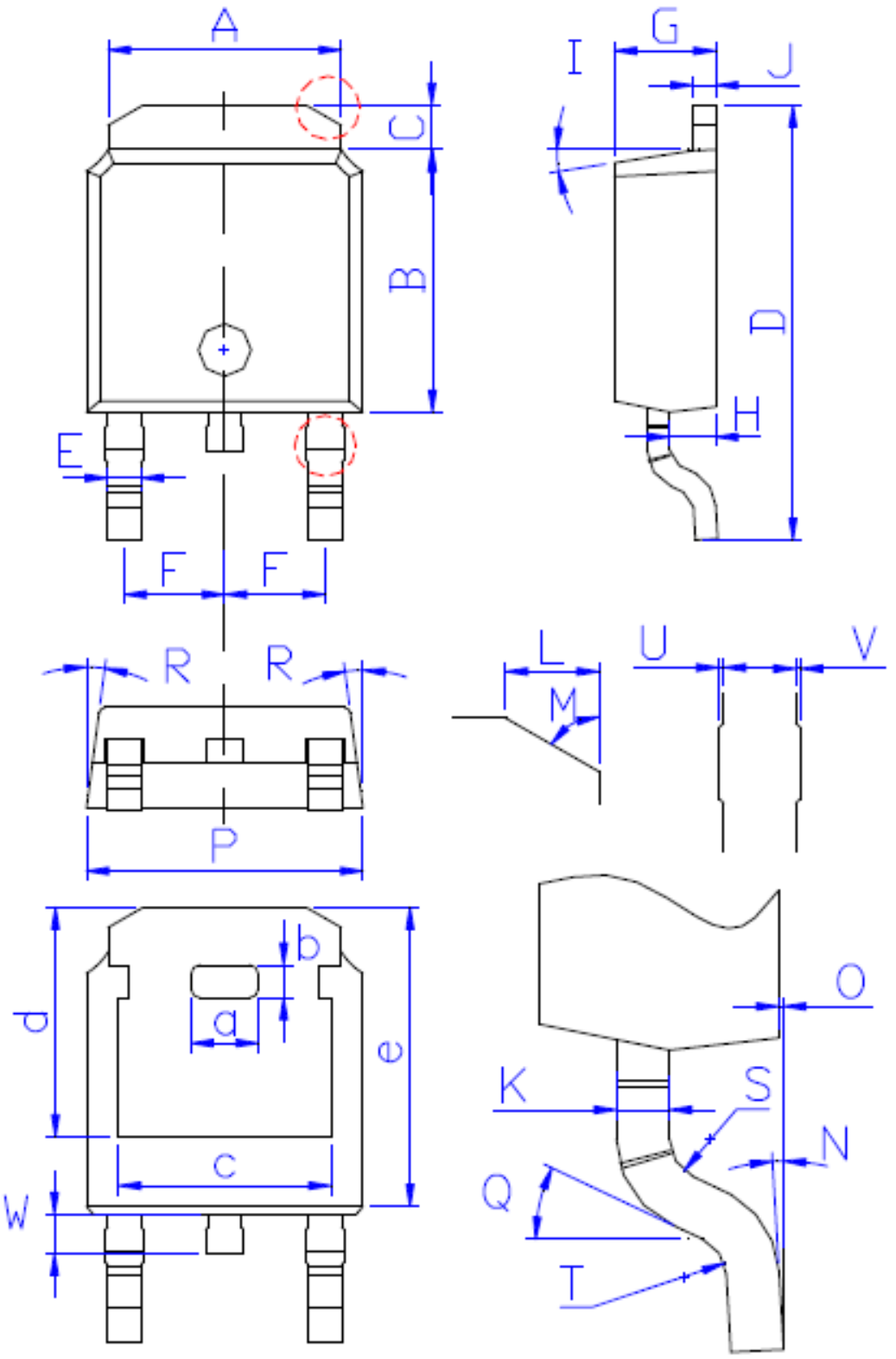
DIM	MILLIMETERS
A	10.16±0.30
A1	7.00±0.20
A2	3.12±0.20
A3	9.70±0.30
B	15.90±0.50
B1	15.60±0.50
B2	4.70±0.30
B3	6.70±0.30
C	3.30±0.25
C1	3.25±0.30
C2	28.70±0.50
D	Typical 2.54
D1	1.47 (MAX)
D2	0.80±0.20
E	2.55±0.25
E1	0.70±0.25
E2	1.0×45°
E3	0.50±0.20
E4	2.75±0.30

（Unit：mm）

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)