

主要参数 MAIN CHARACTERISTICS

ID	250 A
VDSS	100 V
Rdson-typ (@Vgs=10V)	2.5 mΩ
Qg-typ	185 nC

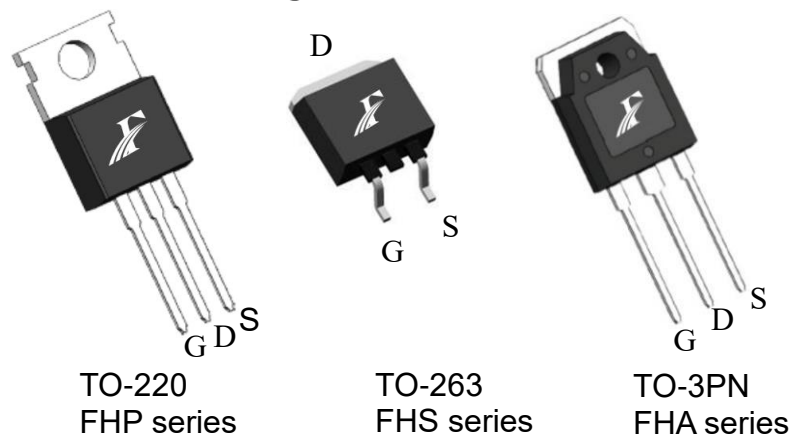
用途 APPLICATIONS

UPS	Uninterruptible Power Supplies
电池管理系统(TO-263)	Battery Management System (TO-263)
同步整流	Synchronus Rectification

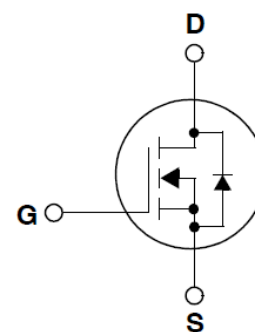
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 54 pF)	Low Crss (typical 54 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
SGT 工艺	SGT technology
符合 RoHS 标准	ROHS compliant

封装形式 Package



等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (Tc25°C)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
		FHP/S250N1F2A	FHA250N1F2A	
最高漏极-源极直流电压 Drain-Source Voltage	VDS	100		V
连续漏极电流* Drain Current -continuous *	ID (Tc=25°C) (Silicon limit)	250		A
	ID (Tc=25°C) (Package limit)	207		A
	ID (Tc=100°C) (Silicon limit)	180		A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	IDM	1000		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	512		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	IAS	32		A
耗散功率 Power Dissipation	Pd (TC=25°C)	227	309	W
	-Derate above 25°C	1.81	2.47	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	TJ, TSTG	150,-55~+150		°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	TL	260		°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	BV _{DSS}	I _D =250μA, V _{GS} =0V	100	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /Δ T _J	I _D =250μA, referenced to 25℃	-	0.10	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V, T _C =25℃	-	-	1	μA
		V _{DS} =80V, T _C =125℃	-	-	10	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	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V , I _D =50A	-	2.5	3.0	mΩ
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} =50V, V _{GS} =0V, f=1.0MHz	-	12355	-	pF
输出电容 Output capacitance	C _{oss}		-	1446	-	
反向传输电容 Reverse transfer capacitance	C _{rss}		-	54	-	
开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	t _{d(on)}	V _{DS} =50V, I _D =50A, R _G =3.0Ω V _{GS} =10V (note 4, 5)	-	35	-	ns
上升时间 Turn-On rise time	t _r		-	111	-	ns
延迟时间 Turn-Off delay time	t _{d(off)}		-	84	-	ns
下降时间 Turn-Off Fall time	t _f		-	112	-	ns
栅极电荷总量 Total Gate Charge	Q _g	V _{DS} =50V , I _D =50A , V _{GS} =10V (note 4, 5)	-	185	-	nC
栅－源电荷 Gate-Source charge	Q _{gs}		-	54	-	nC
栅－漏电荷 Gate-Drain charge	Q _{gd}		-	48	-	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		-	-	250	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		-	-	1000	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 =50A ,dI _F /dt=100A/μs (note 4)	-	86	-	ns
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	210	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP/S250N1F2A	FHA250N1F2A	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.55	0.40	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	40	℃/W

注释：
1：脉冲宽度由最高结温限制
2：L=1mH, IAS=32A, VDD=50V, RG=25 Ω,起始结温 TJ=25℃
3：ISD ≤250A,di/dt ≤100A/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=32A, VDD=50V, RG=25 Ω,Starting TJ=25℃
3: ISD ≤250A,di/dt ≤100A/μs,VDD≤BVdss, Starting TJ=25℃
4: Pulse Test: Pulse Width ≤300μs,Duty Cycle≤2％
5: Essentially independent of operating temperature

特性曲线 Typical Characteristics

Fig 1: Output Characteristics

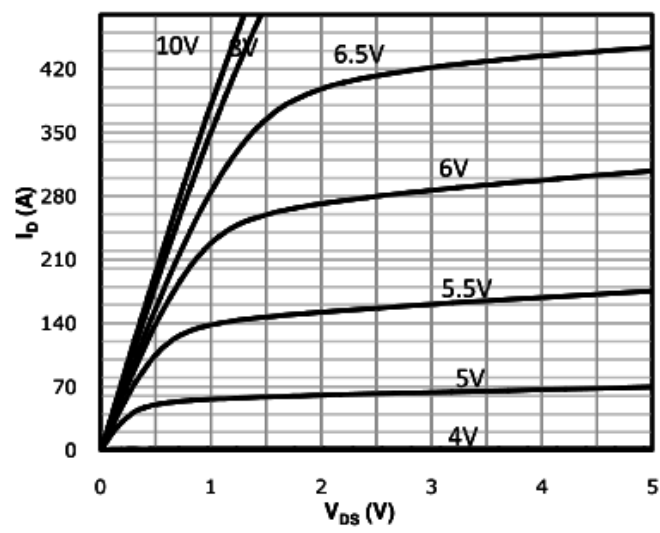
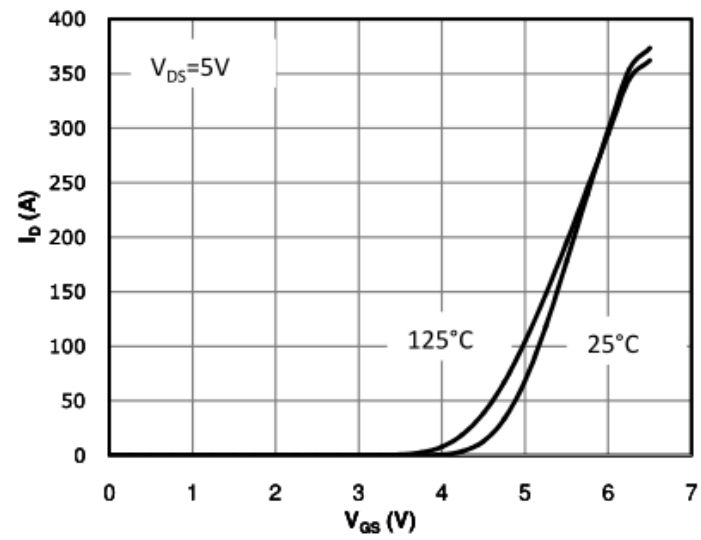


Fig 2: Transfer Characteristics



3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

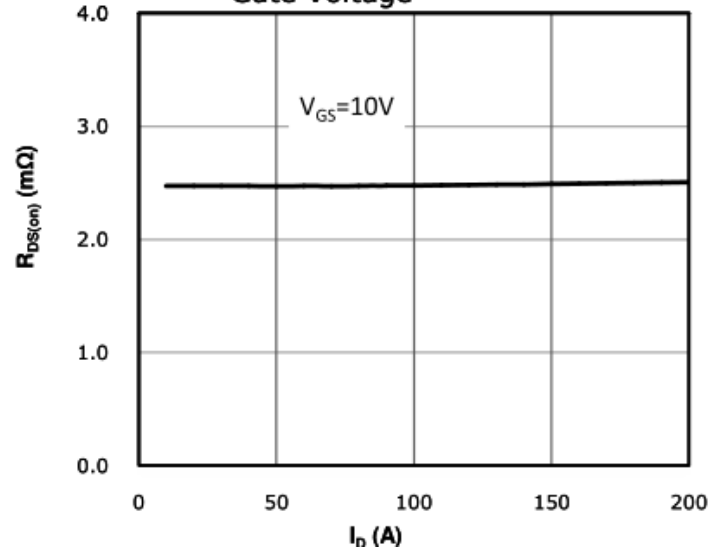


Fig 4: $R_{DS(on)}$ vs Gate Voltage

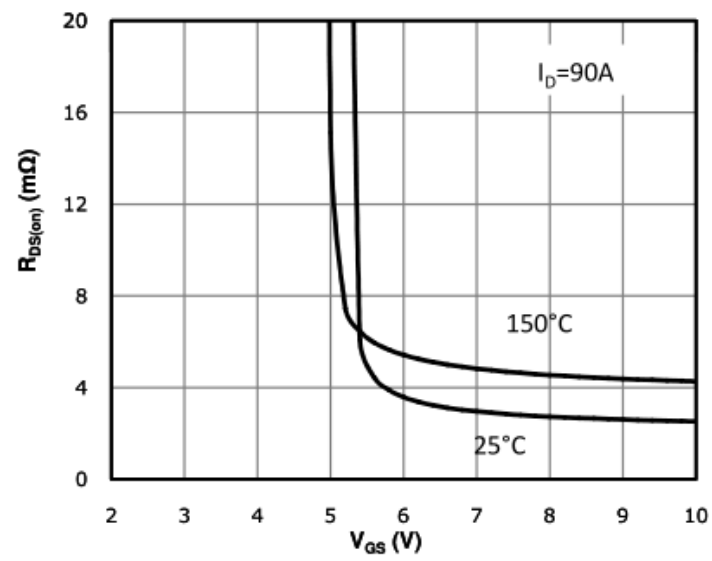


Fig 5: $R_{DS(on)}$ vs. Temperature

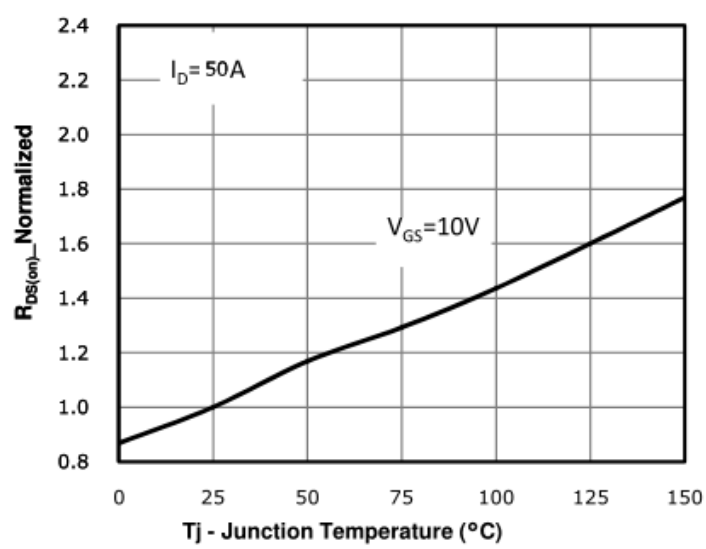
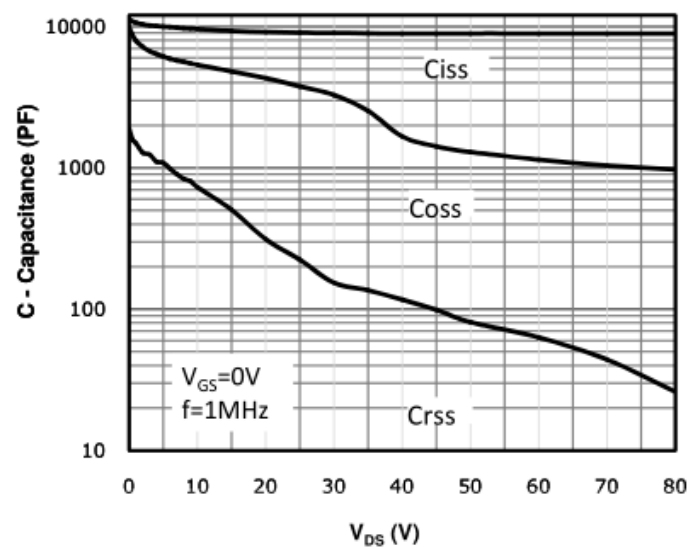
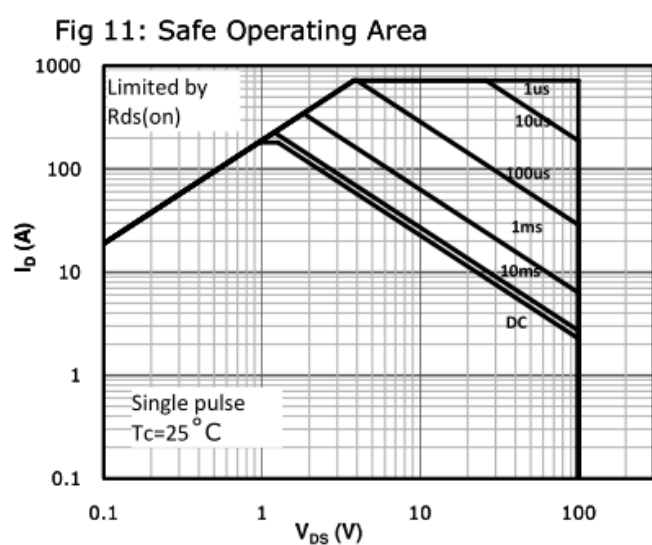
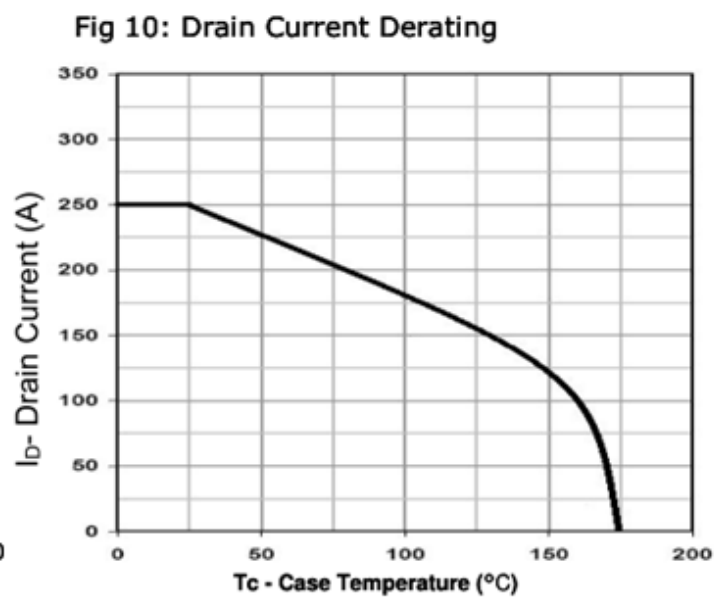
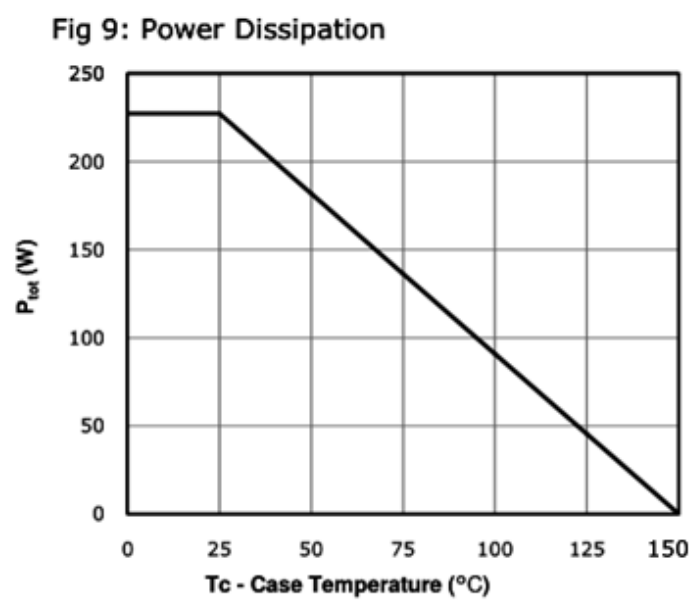
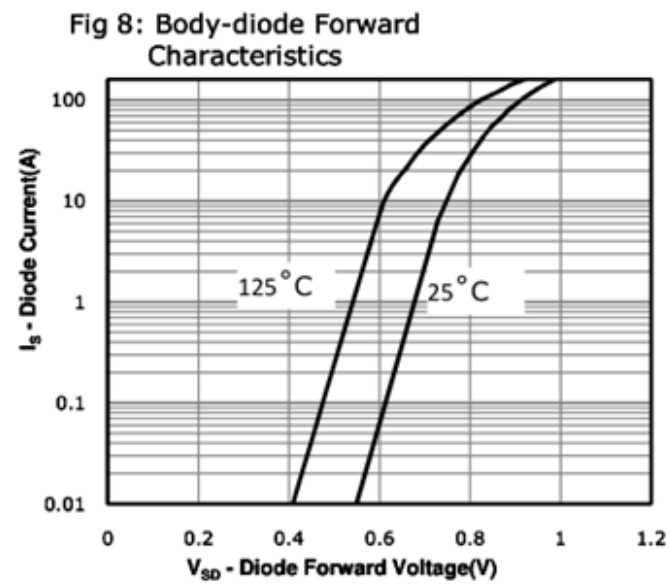
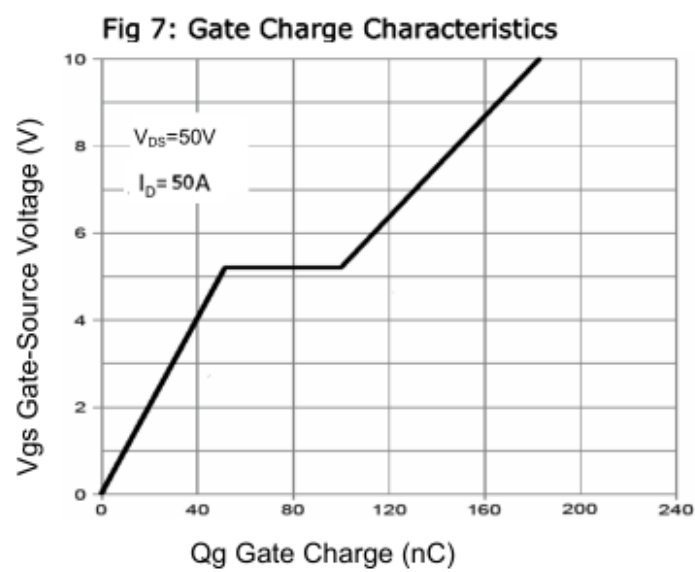
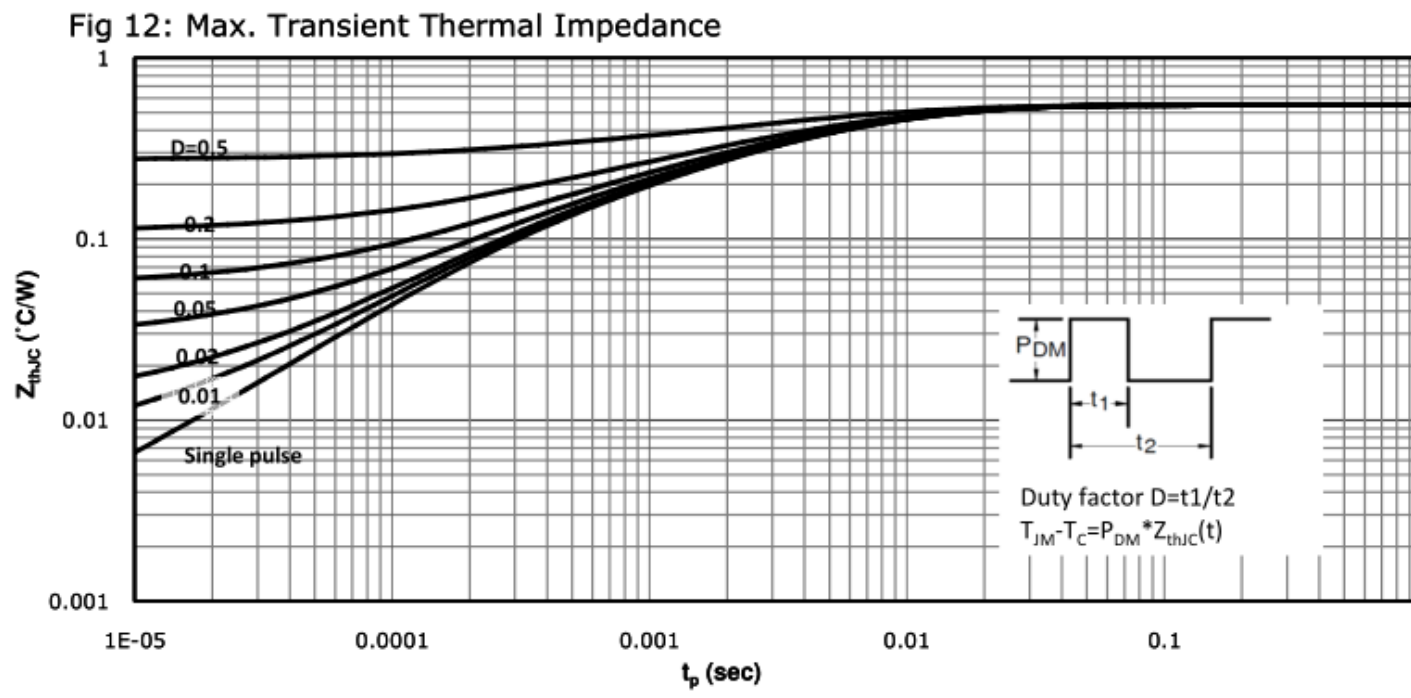


Fig 6: Capacitance Characteristics

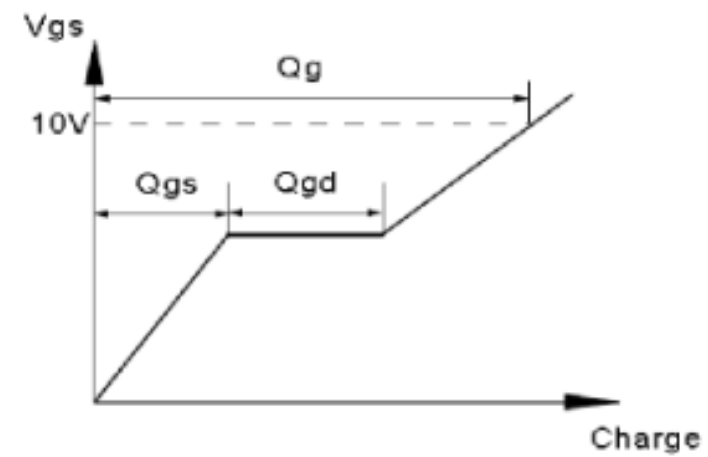
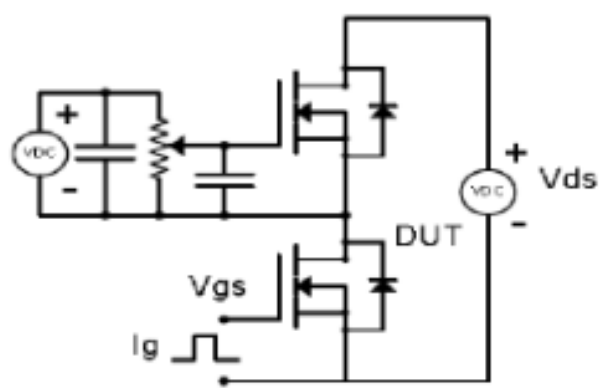




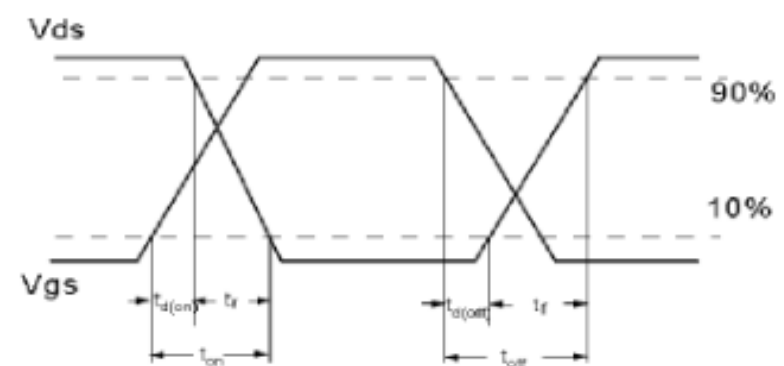
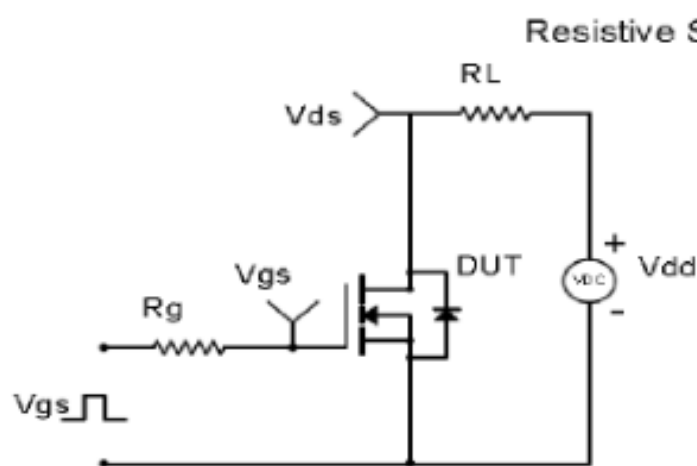


Test Circuit & Waveform

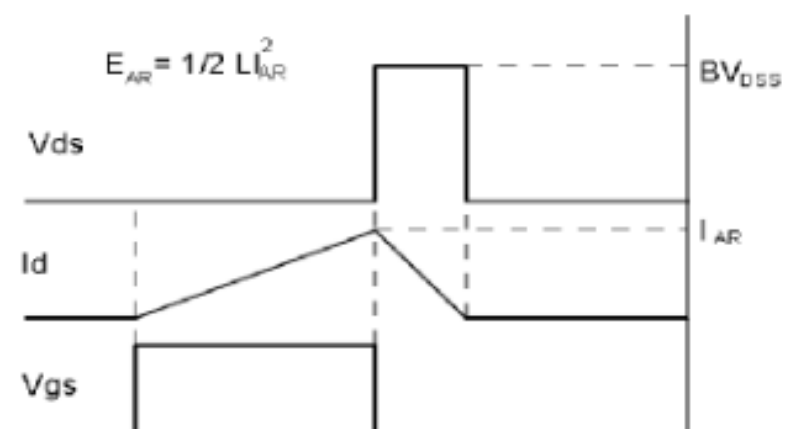
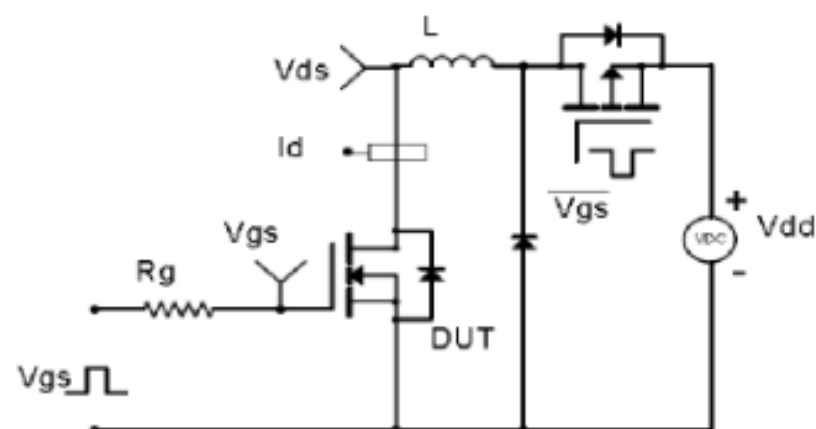
Gate Charge Test Circuit & Waveform



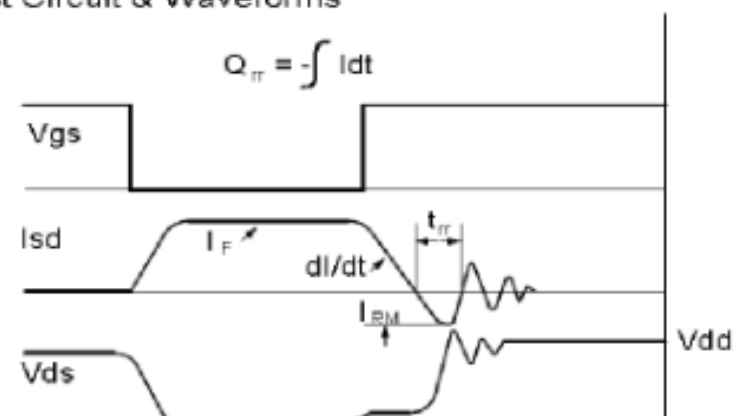
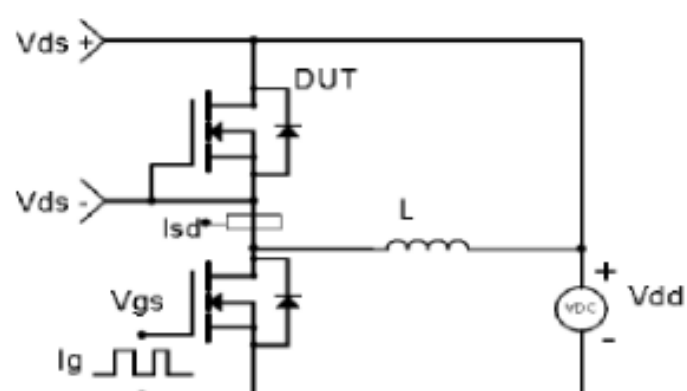
Resistive Switching Test Circuit & Waveforms



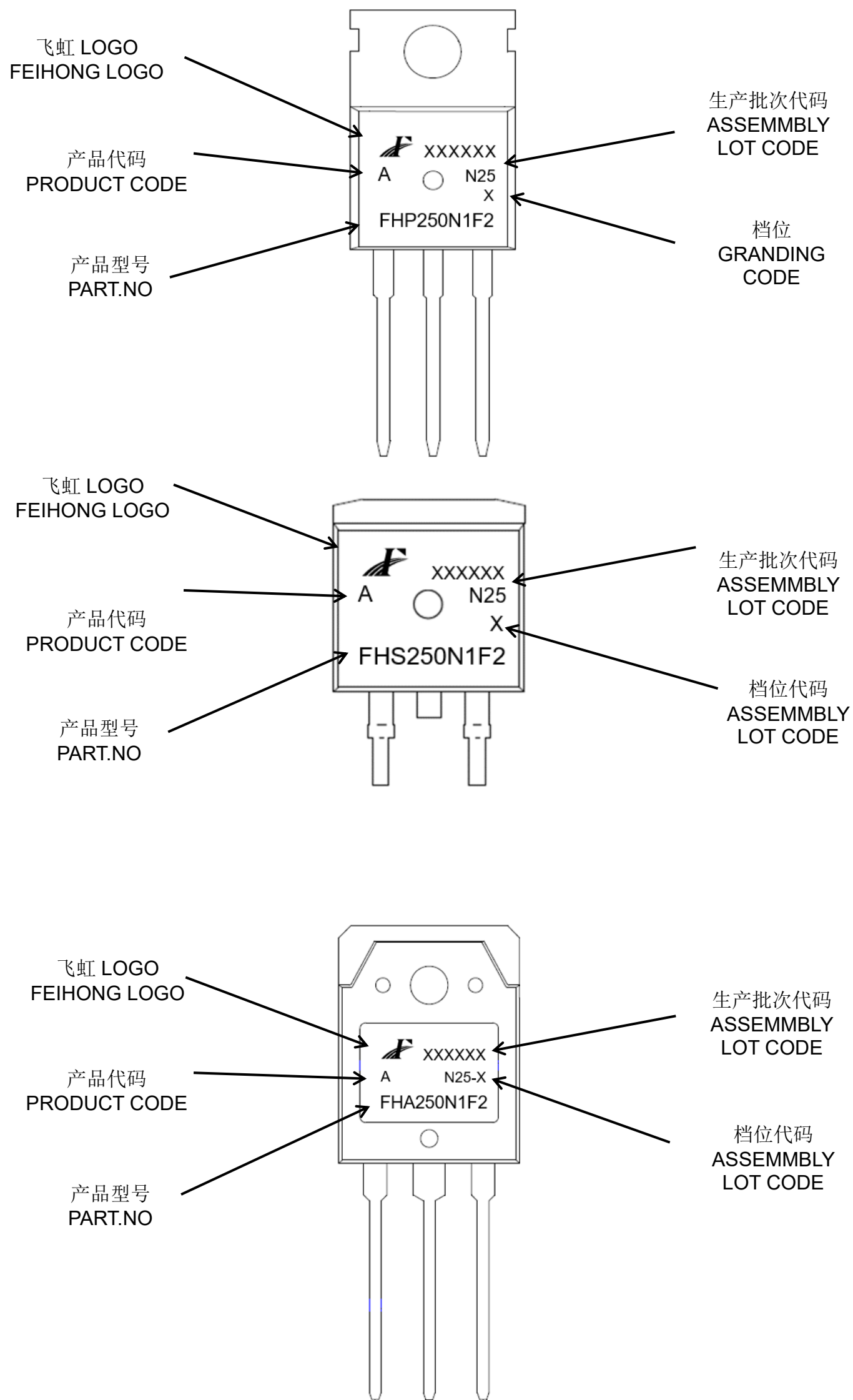
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



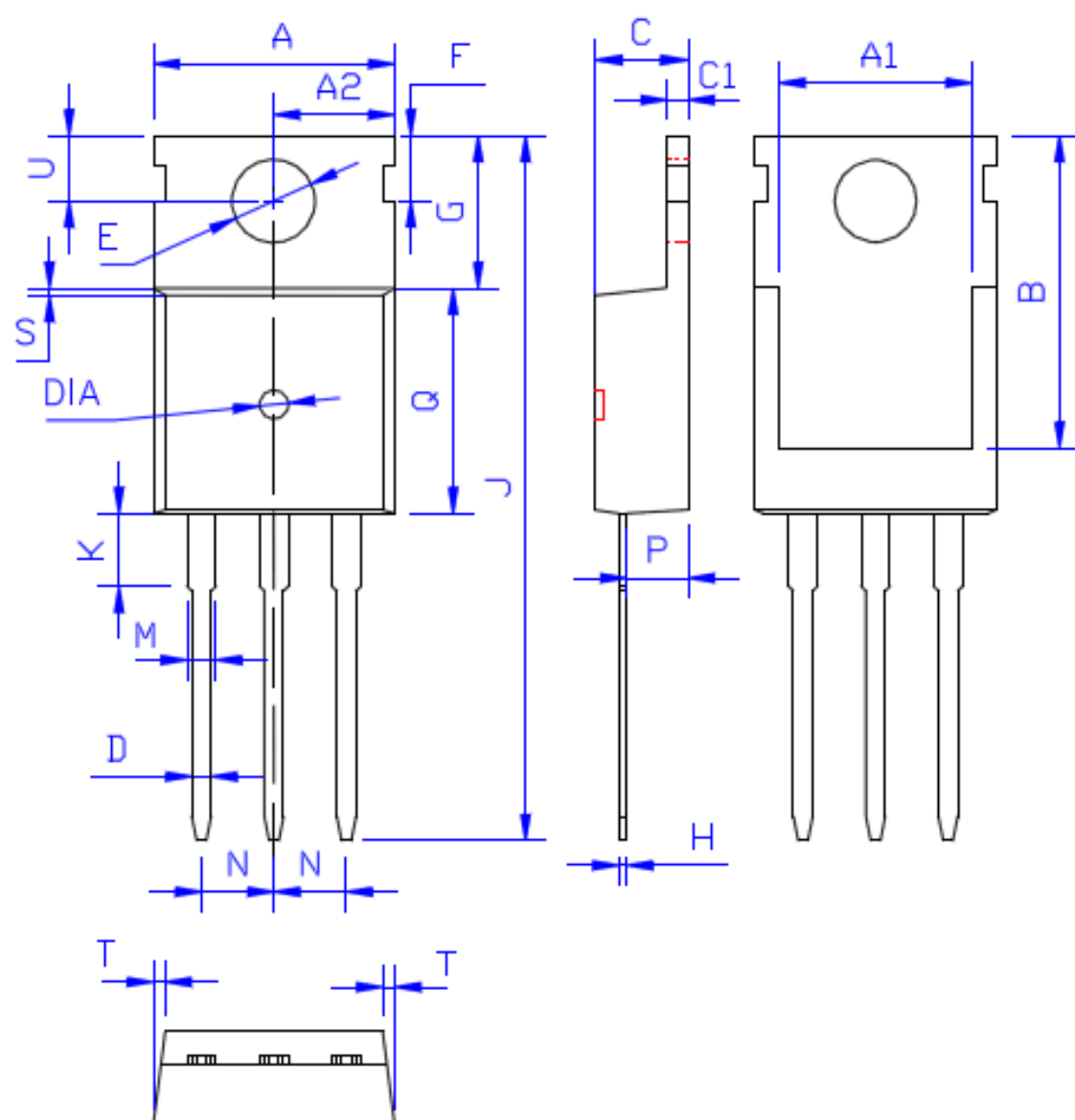
印记 Marking:



外形尺寸:

Package Dimension:

TO-220



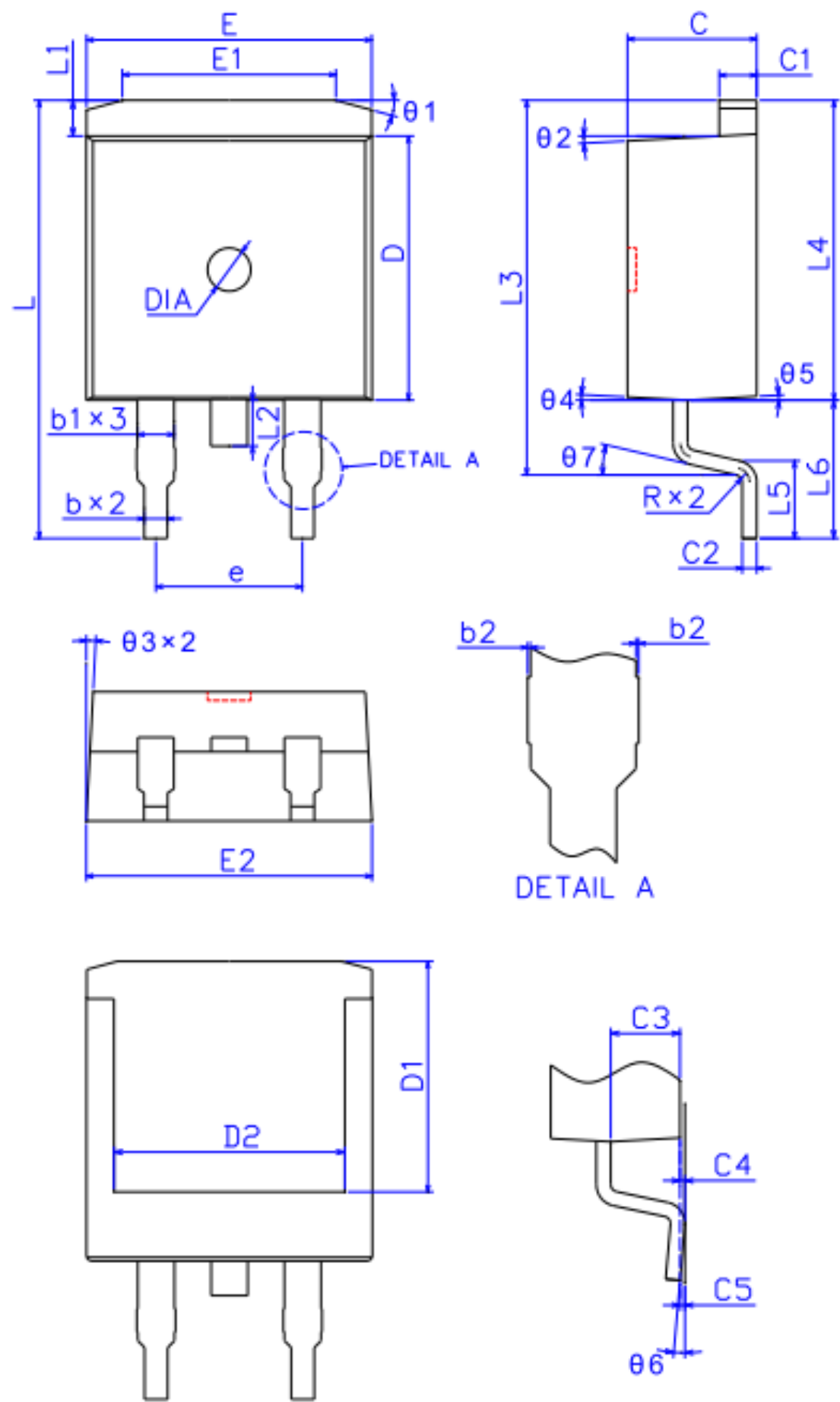
DIM	MILLIMETERS
A	10.00 ± 0.30
A1	8.00 ± 0.30
A2	5.00 ± 0.30
B	13.20 ± 0.40
C	4.50 ± 0.20
C1	1.30 ± 0.20
D	0.80 ± 0.20
E	3.60 ± 0.20
F	3.00 ± 0.30
G	6.60 ± 0.40
H	0.50 ± 0.20
J	28.88 ± 0.50
K	3.00 ± 0.30
M	1.30 ± 0.30
N	Typical 2.54
P	2.40 ± 0.40
Q	9.20 ± 0.40
S	0.25 ± 0.15
T	0.25 ± 0.15
U	2.80 ± 0.30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

(Unit: mm)

外形尺寸:

Package Dimension:

TO-263

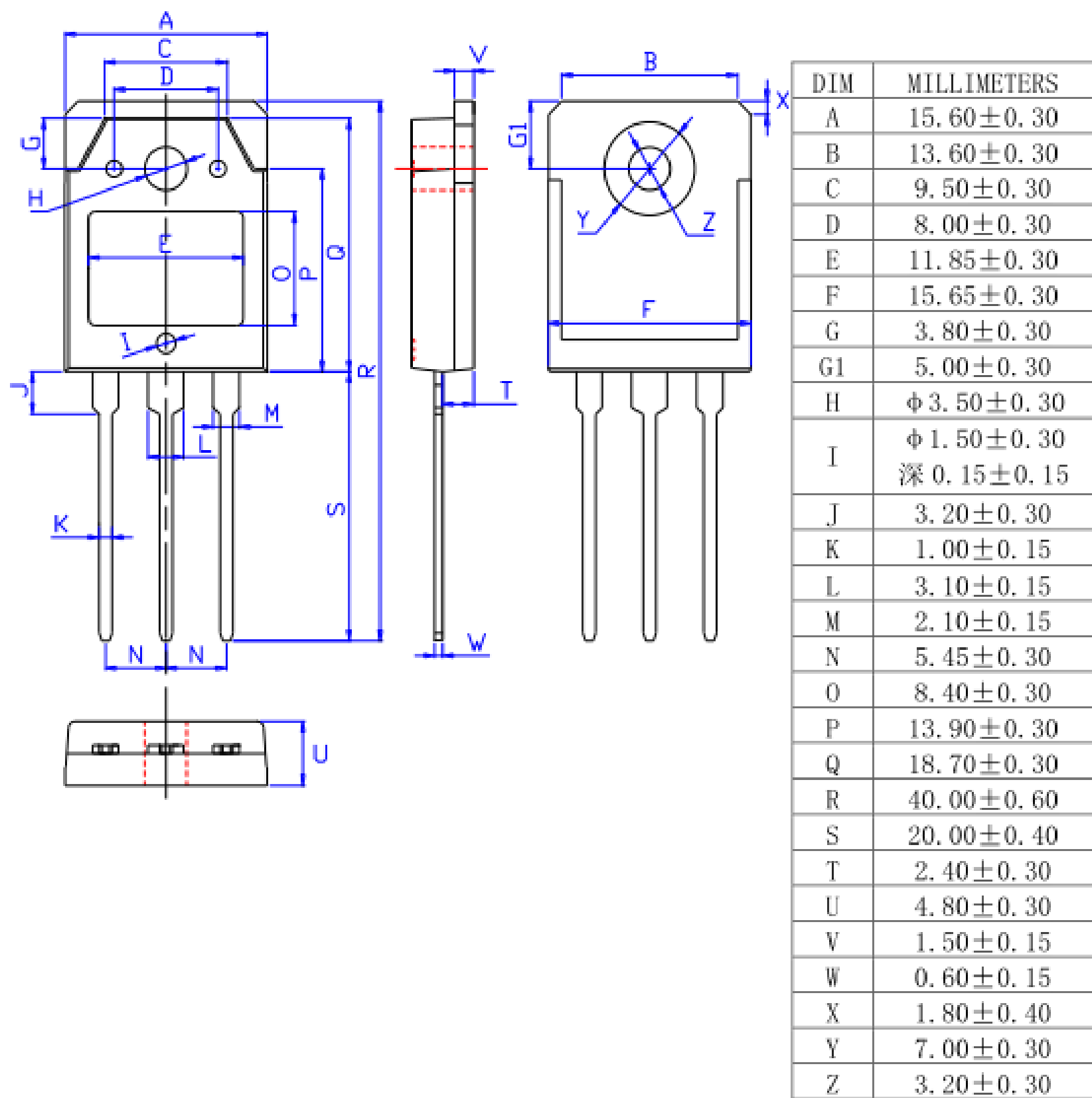


标注	尺寸(mm)
E	9.88±0.10
E1	7.40±0.20
E2	9.90±0.15
L	15.20±0.25
L1	1.30±0.15
L2	1.60±0.10
L3	13.00±0.20
L4	10.40±0.15
L5	2.60±0.15
L6	4.80±0.20
b	0.80±0.07
b1	1.27±0.07
b2	0.05±0.07
C	4.48±0.10
C1	1.30±0.07
C2	0.50±0.07
C3	2.40±0.06
C4	0.10±0.08
C5	0.10±0.08
D	9.20±0.10
D1	8.00±0.10
D2	8.00±0.10
R	0.50±0.10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

外形尺寸:

Package Dimension:

TO-3PN



(Units: mm)