N 沟道增强型场效应晶体管
N-CHANNEL MOSFET
FHP150N03C/FHS150N03C/FHD150N03C

主要参数 MAIN CHARACTERISTICS

ID	150 A
VDSS	30 V
Rdson-typ（ @Vgs=10V）	2.2mΩ
Rdson-typ（ @Vgs=4.5V）	2.8mΩ
Qg-typ	85nC

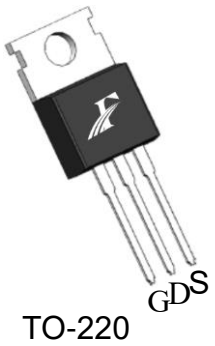
产品特性 FEATURES

低栅极电荷	Low gate charge
低 Crss (典型值 405pF)	Low Crss (typical 405pF)
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

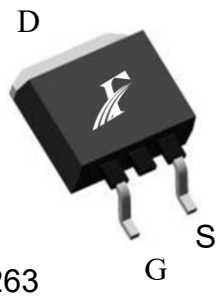
用途 APPLICATIONS

电池管理系统	BMS(Battery Management System)
电机控制和驱动	Motor control and drive
不间断电源	UPS(Uninterrupible Power Supplies)
逆变器	Power Management in Inverter system

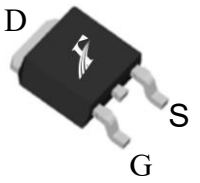
封装形式 Package



TO-220
FHP series

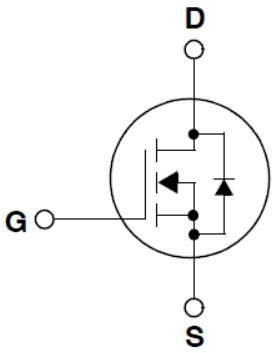


TO-263
FHS series



TO-252
FHD series

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**
		FHP150N03C	**FHS150N03C**	**FHD150N03C**	
最高漏极一源极直流电压 Drain-Source Voltage	V_{DS}	30			V
连续漏极电流* Drain Current -continuous *	I_D（T_C=25℃）	150			A
	I_D（T_C=100℃)	96			A
最大脉冲漏极电流（注 1） Drain Current – pulse（note 1）	I_{DM}	600			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}	313			mJ
雪崩电流（注 1） Avalanche Current（note 1）	I_{AS}	25			A
重复雪崩能量（注 1） Repetitive Avalanche Current（note 1）	E_{AR}	20			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℃）	150	150	91	W
	-Derate above 25℃	1.33	1.33	0.6	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**						
漏一源击穿电压 Drain-Source Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25℃	-	0.03	-	V/℃
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V,V_{GS}=0V, T_C=25℃	-	-	1	μA
		V_{DS}=24V, 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} = VGS , I_D=250μA	0.8	1.5	2.5	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS} =10V , I_D=50A	-	2.2	4	mΩ
		V_{GS} =4.5V , I_D=30A	-	2.8	5	
正向跨导 Forward Transconductance	gfs	V_{DS} = 20V, I_D=40A（note 4）	-	90	-	S
动态特性 **Dynamic Characteristics**						
栅电阻 Gate Resistance	Rg	f=1.0MHz, V_{DS} OPEN	-	1.6	-	Ω
输入电容 Input capacitance	Ciss	V_{DS}=15V, V_{GS} =0V, f=1.0MHz	-	5150	-	pF
输出电容 Output capacitance	Coss		-	580	-	
反向传输电容 Reverse transfer capacitance	Crss		-	405	-	
开关特性 **Switching Characteristics**						
延迟时间 Turn-On delay time	td(on)	V_{DS}=15V, I_D=20A, R_G=3Ω V_{GS} =10V （note 4，5）	-	14	-	ns
上升时间 Turn-On rise time	tr		-	18	-	ns
延迟时间 Turn-Off delay time	td(off)		-	43	-	ns
下降时间 Turn-Off Fall time	tf		-	16	-	ns
栅极电荷总量 Total Gate Charge	Qg	V_{DS} =15V , I_D=20A , V_{GS} =10V （note 4，5）	-	85	-	nC
栅一源电荷 Gate-Source charge	Qgs		-	14	-	nC
栅一漏电荷 Gate-Drain charge	Qgd		-	23	-	nC
漏一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		-	-	150	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	600	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=40A	-	0.82	1.3	V
反向恢复时间 Reverse recovery time	trr	V_{GS}=0V, I_S=20A ,dI_F/dt=100A/μs (note 4)	-	37	-	ns
反向恢复电荷 Reverse recovery charge	Qrr		-	32	-	nC

热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	FHP150N03C	FHS150N03C	FHD150N03C	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Rth(j-c)	0.83	0.83	1.38	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	Rth(j-A)	62.5	62.5	105	℃/W

注释:

1：脉冲宽度由最高结温限制

2：L=1mH, I_{AS}=25A, V_{DD}=25V, R_G=25 Ω,起始结温 T_J=25℃

3：I_{SD} ≤150A,di/dt ≤300A/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=1mH, I_{AS}=25A, V_{DD}=25V, R_G=25 Ω,Starting T_J=25℃

3：I_{SD} ≤150A,di/dt ≤300A/μs,V_{DD}≤BV_{DSS}, Starting T_J=25℃

4：Pulse Test：Pulse Width ≤300μs,Duty Cycle≤2%

5：Essentially independent of operating temperature

Typical Characteristics

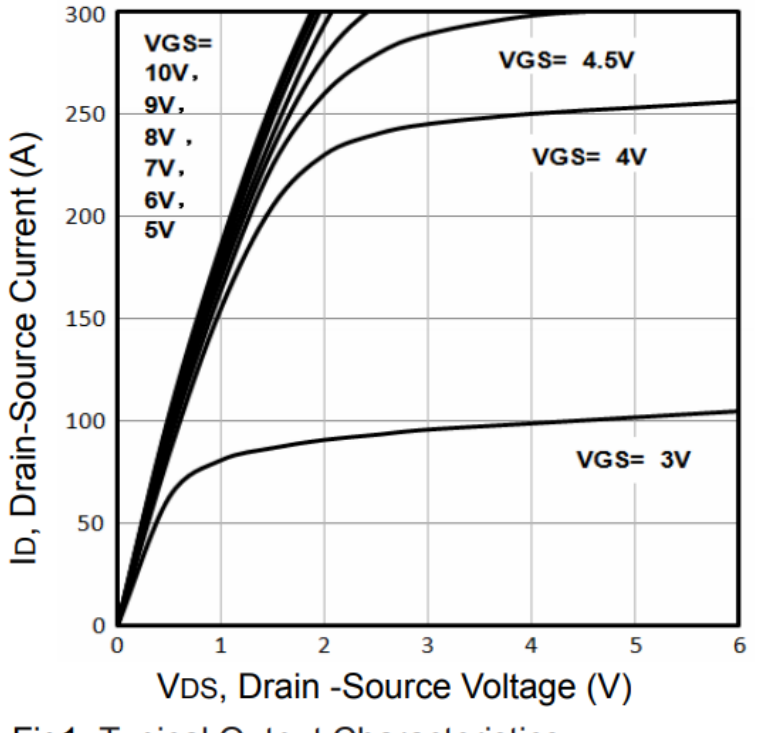


Fig1. Typical Output Characteristics

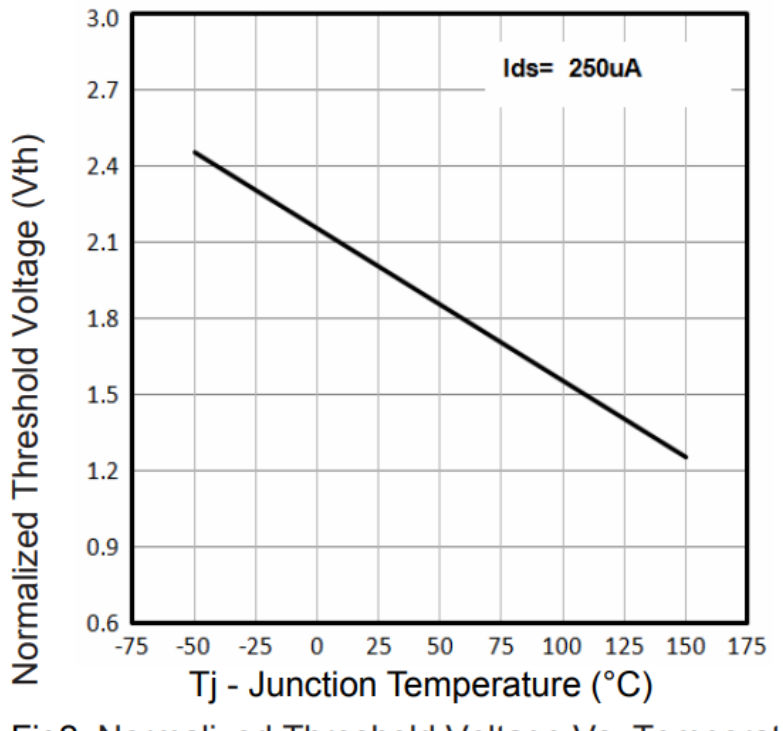


Fig2. Normalized Threshold Voltage Vs. Temperature

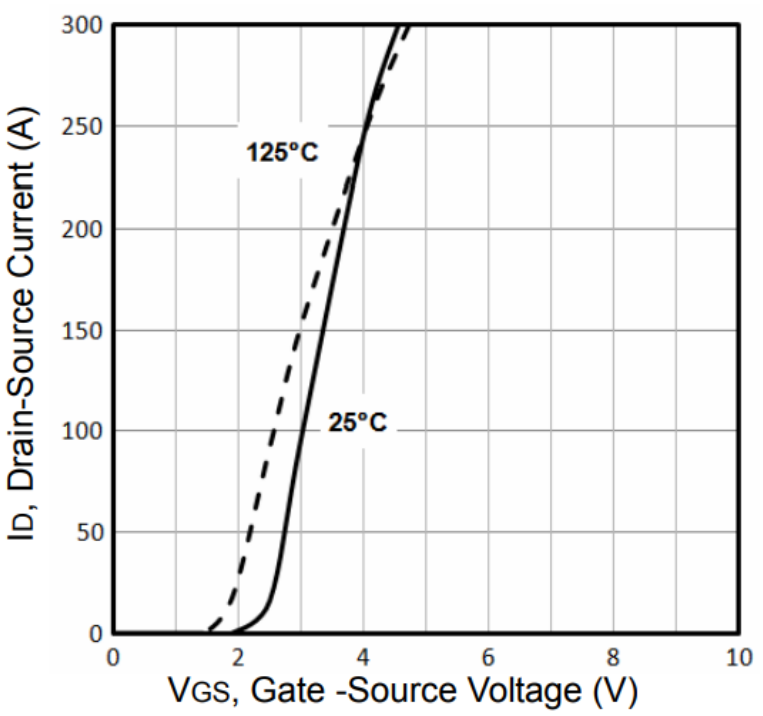


Fig3. Typical Transfer Characteristics

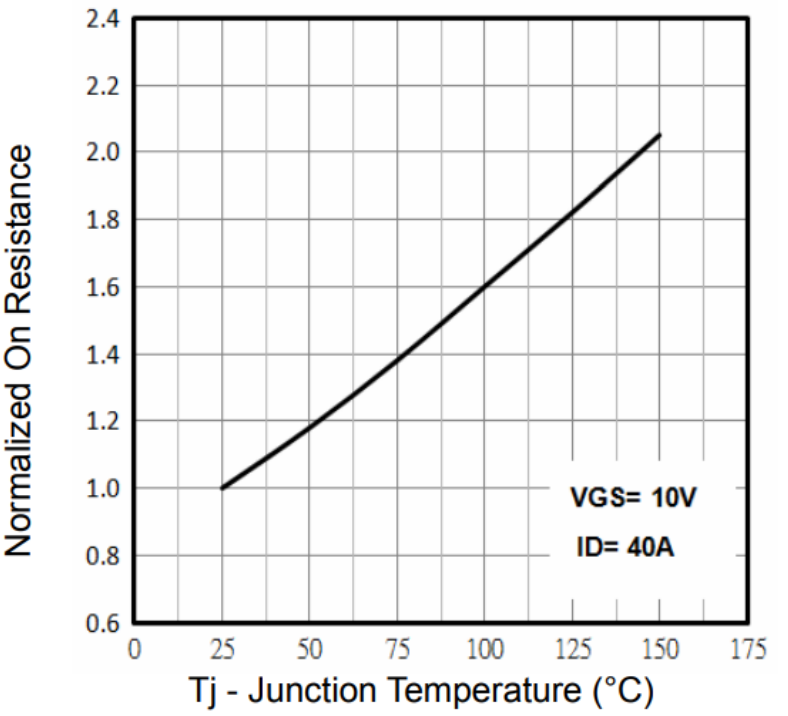


Fig4. Normalized On-Resistance Vs. Temperature

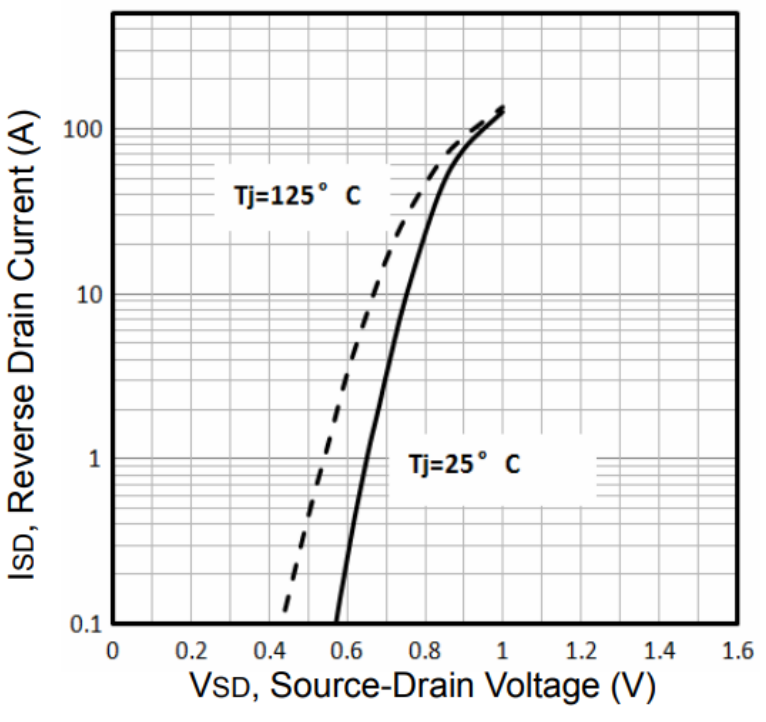


Fig5. Typical Source-Drain Diode Forward Voltage

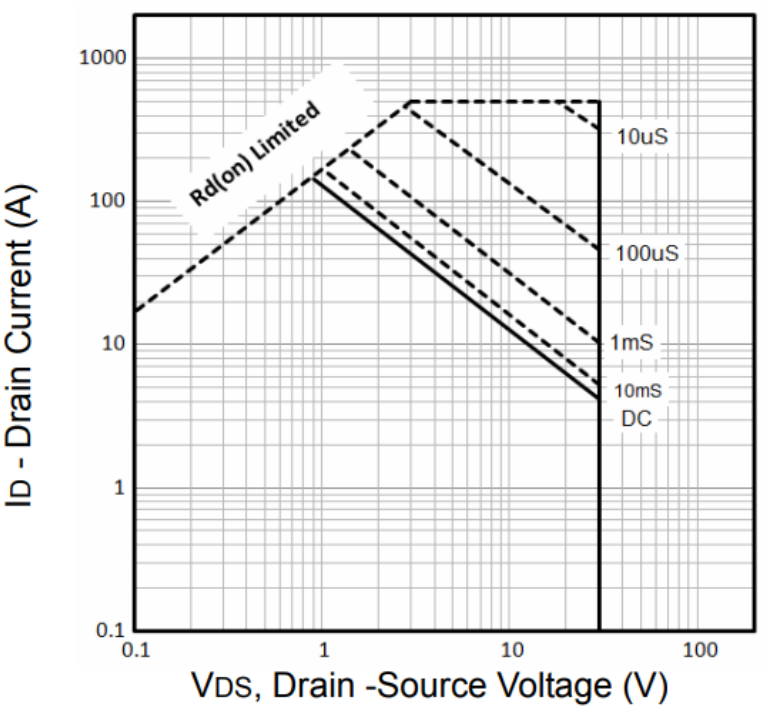


Fig6. Maximum Safe Operating Area

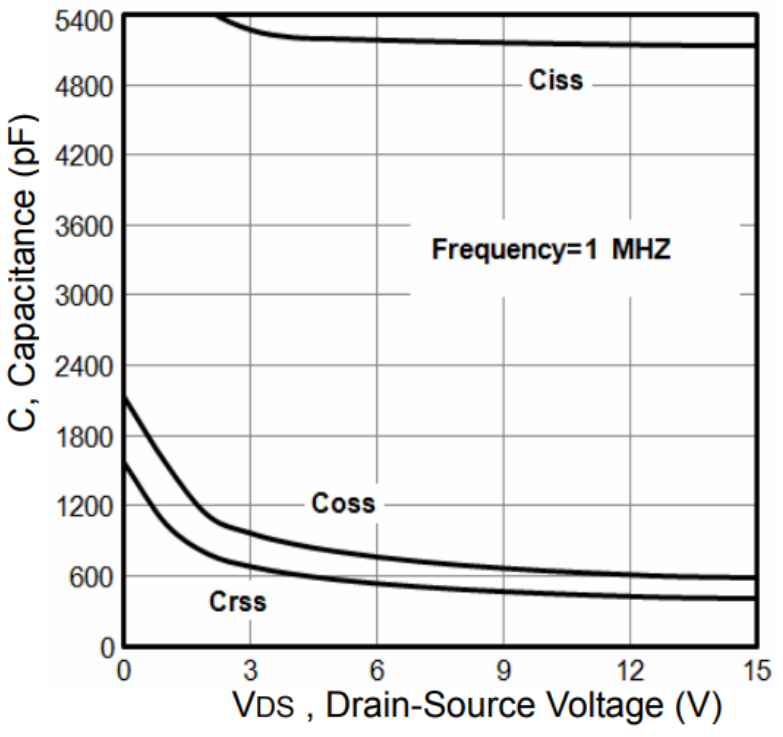


Fig7. Typical Capacitance Vs.Drain-Source Voltage

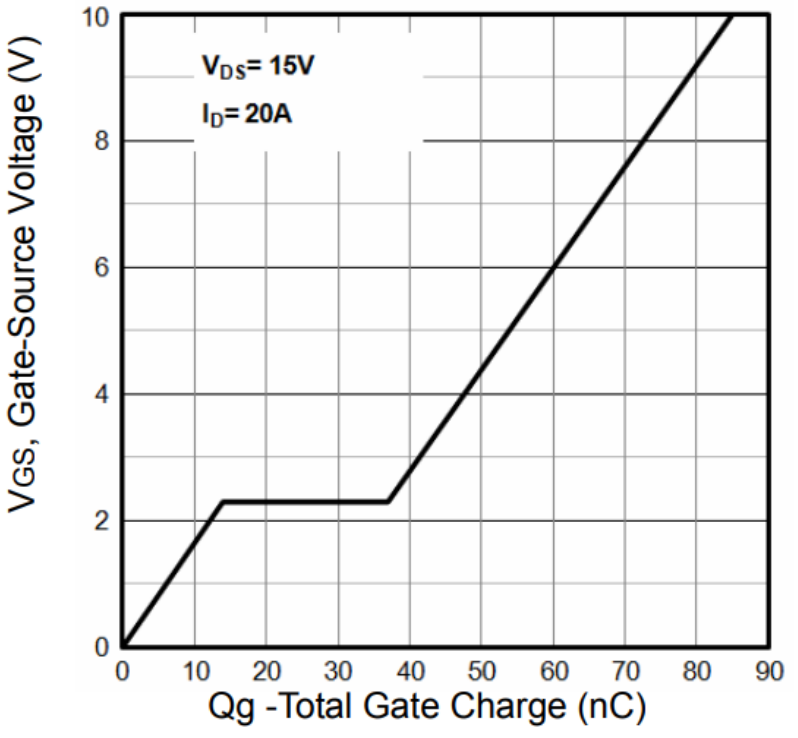


Fig8. Typical Gate Charge Vs.Gate-Source

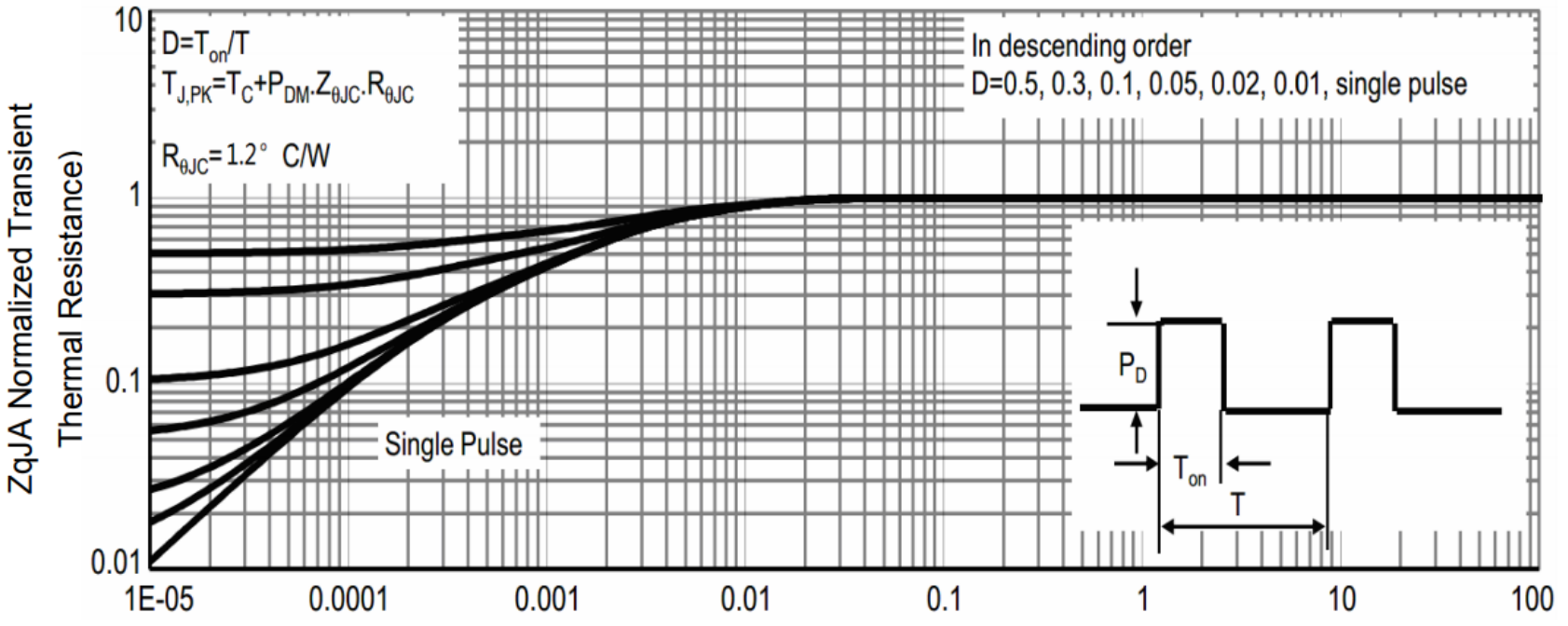
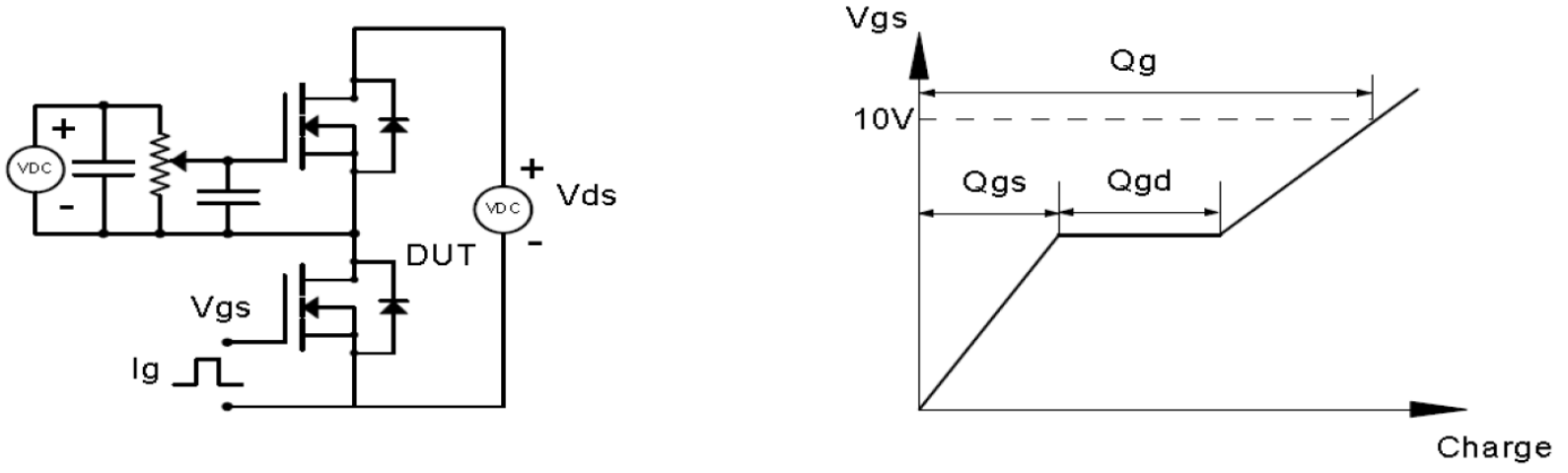


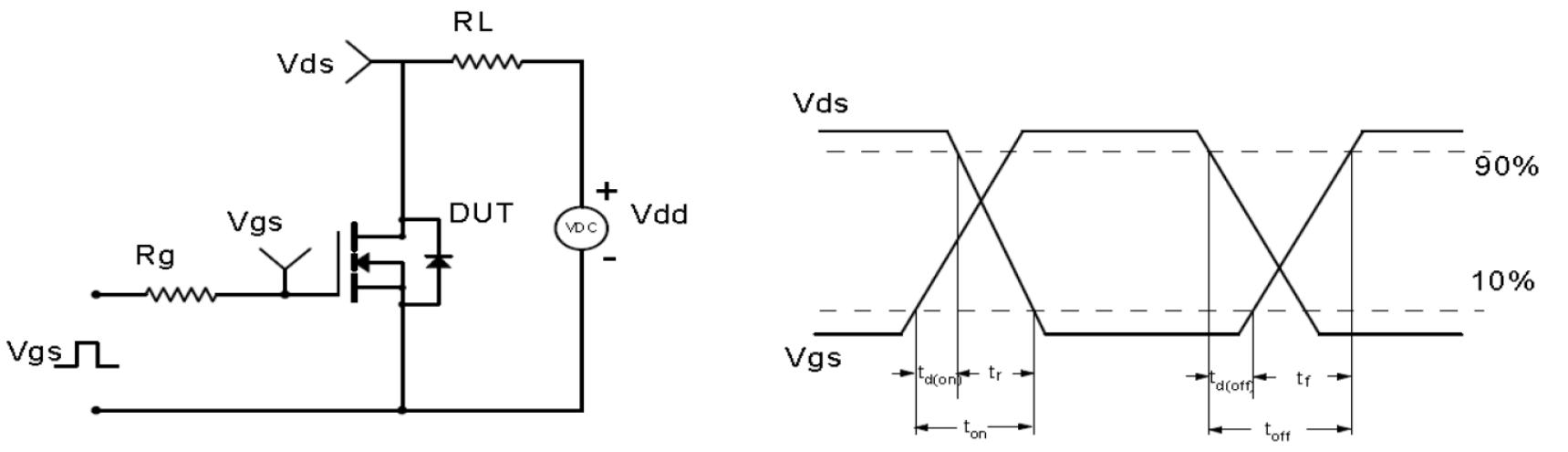
Fig9. Normalized Maximum Transient Thermal Impedance

Test Circuit & Waveform

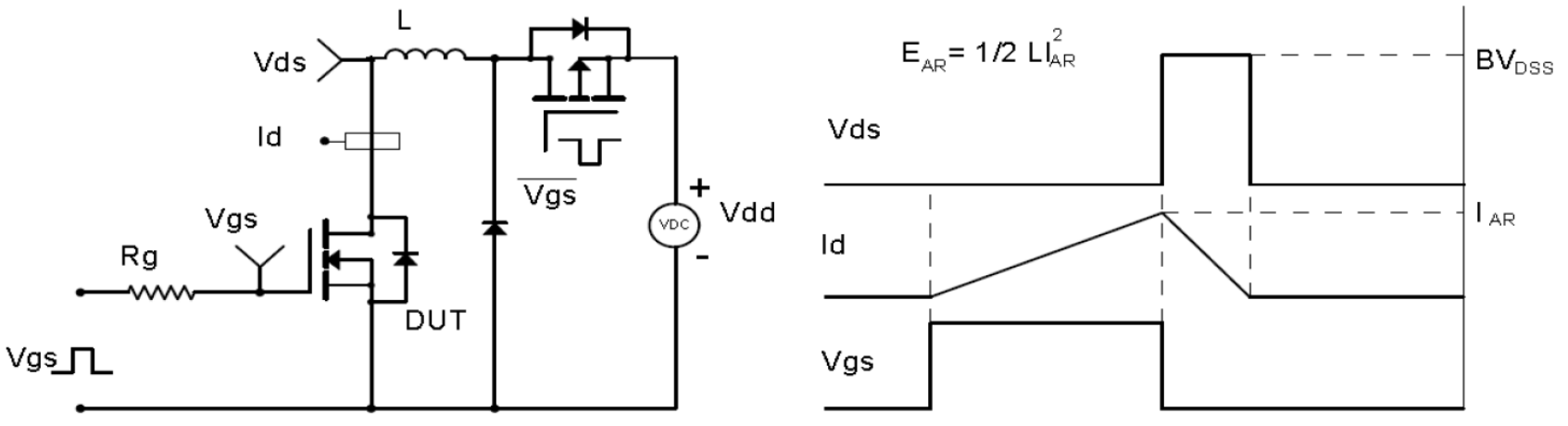
Gate Charge Test Circuit & Waveform



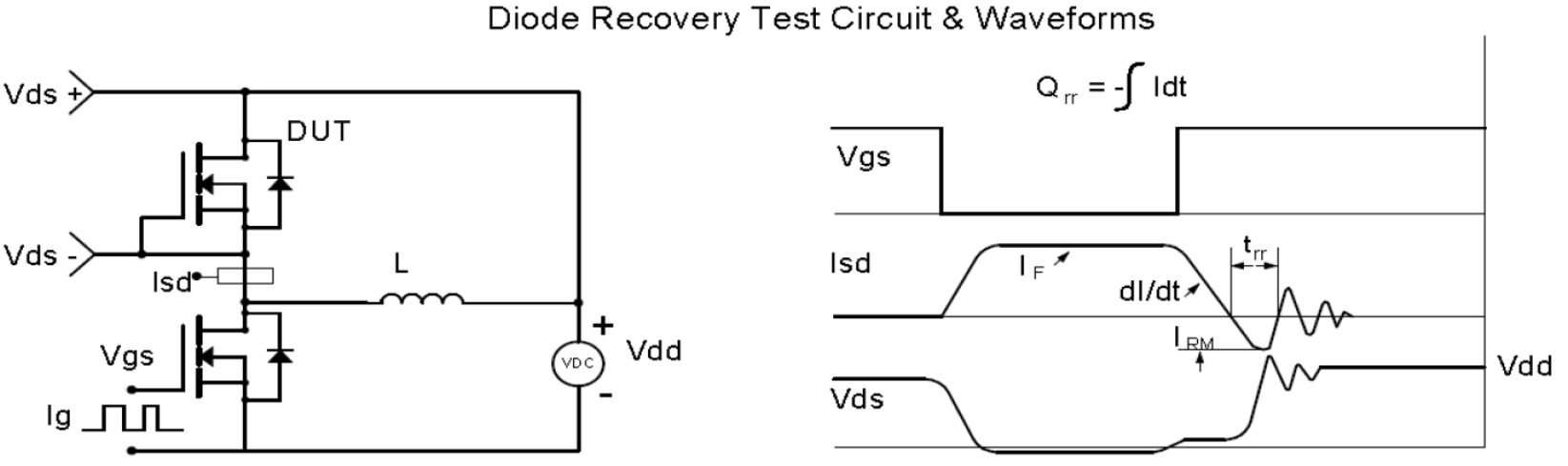
Resistive Switching Test Circuit & Waveforms



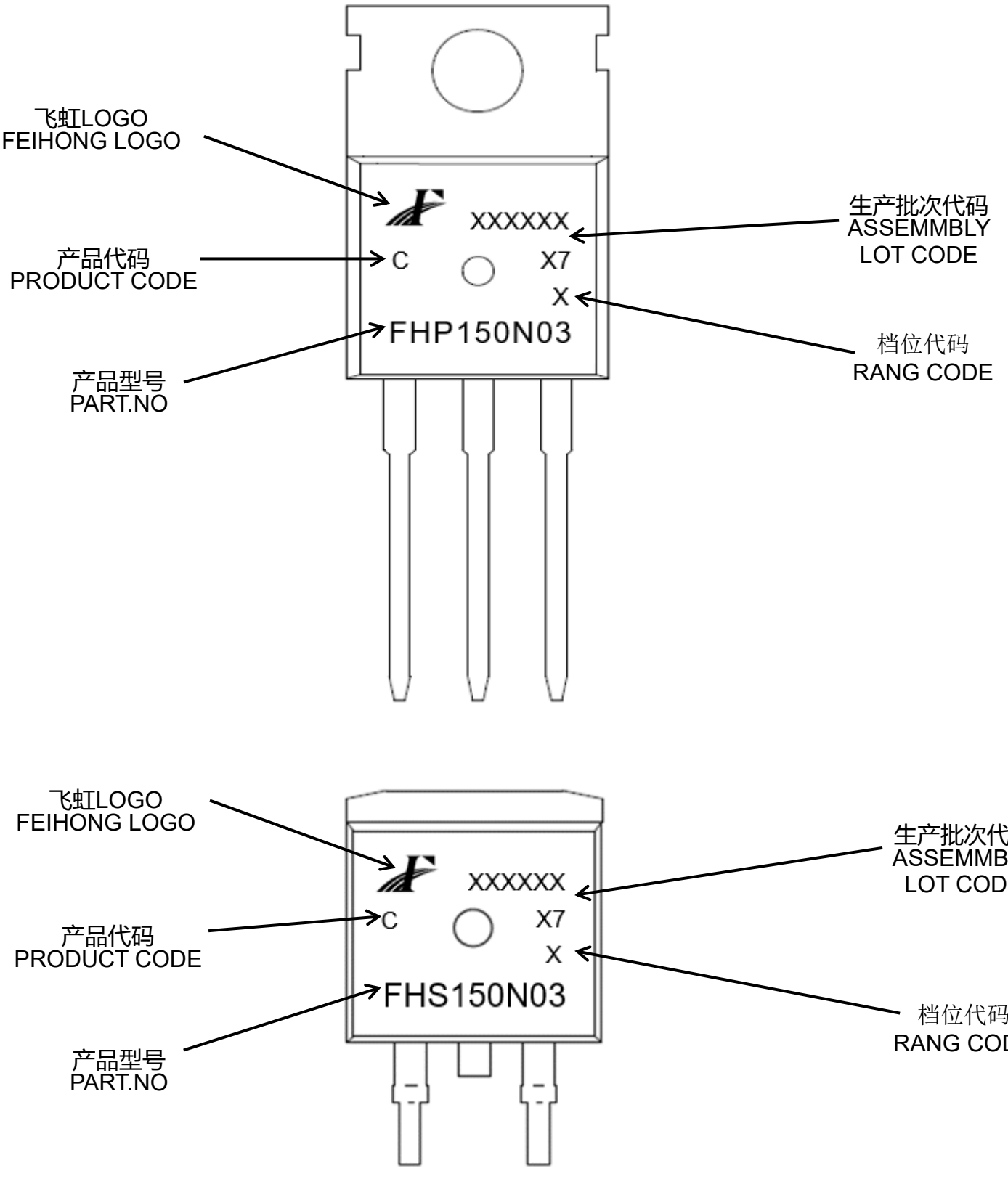
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



印记 Marking:


飞虹LOGO
FEIHONG LOGO
XXXXXX
C
X7
X
FHP150N03
产品代码
PRODUCT CODE
产品型号
PART.NO
生产批次代码
ASSEMMBLY
LOT CODE
档位代码
RANG CODE

飞虹LOGO
FEIHONG LOGO
XXXXXX
C
X7
X
FHS150N03
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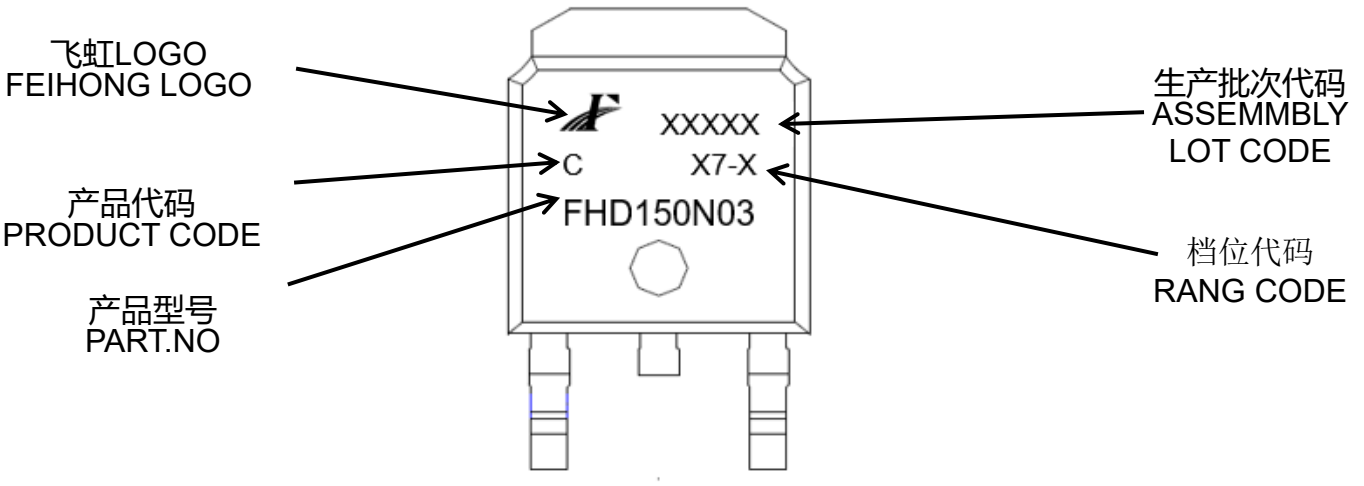
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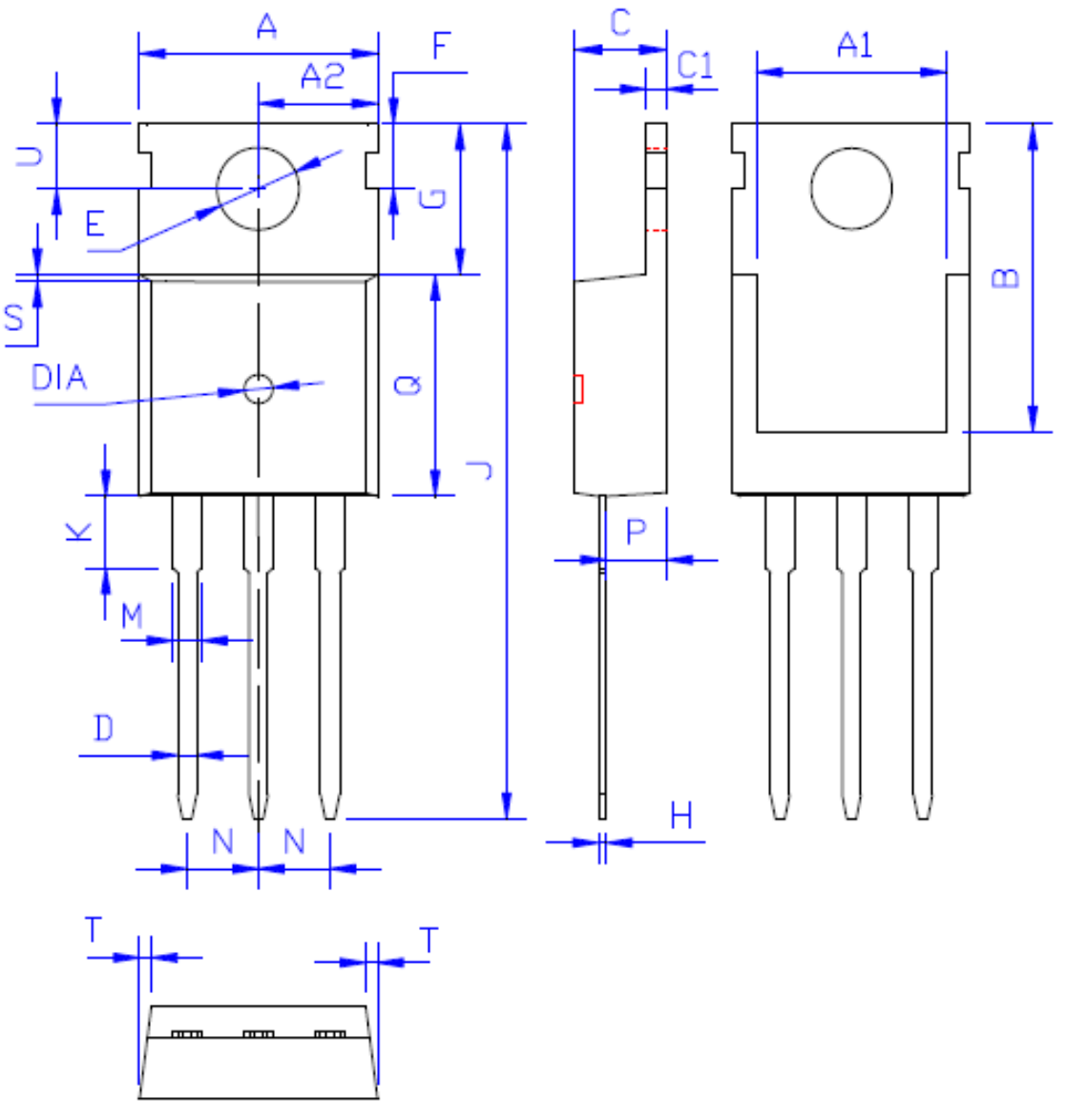
ASSEMMBLY
LOT CODE
档位代码
RANG CODE

外形尺寸：

Package Dimension：

TO-220



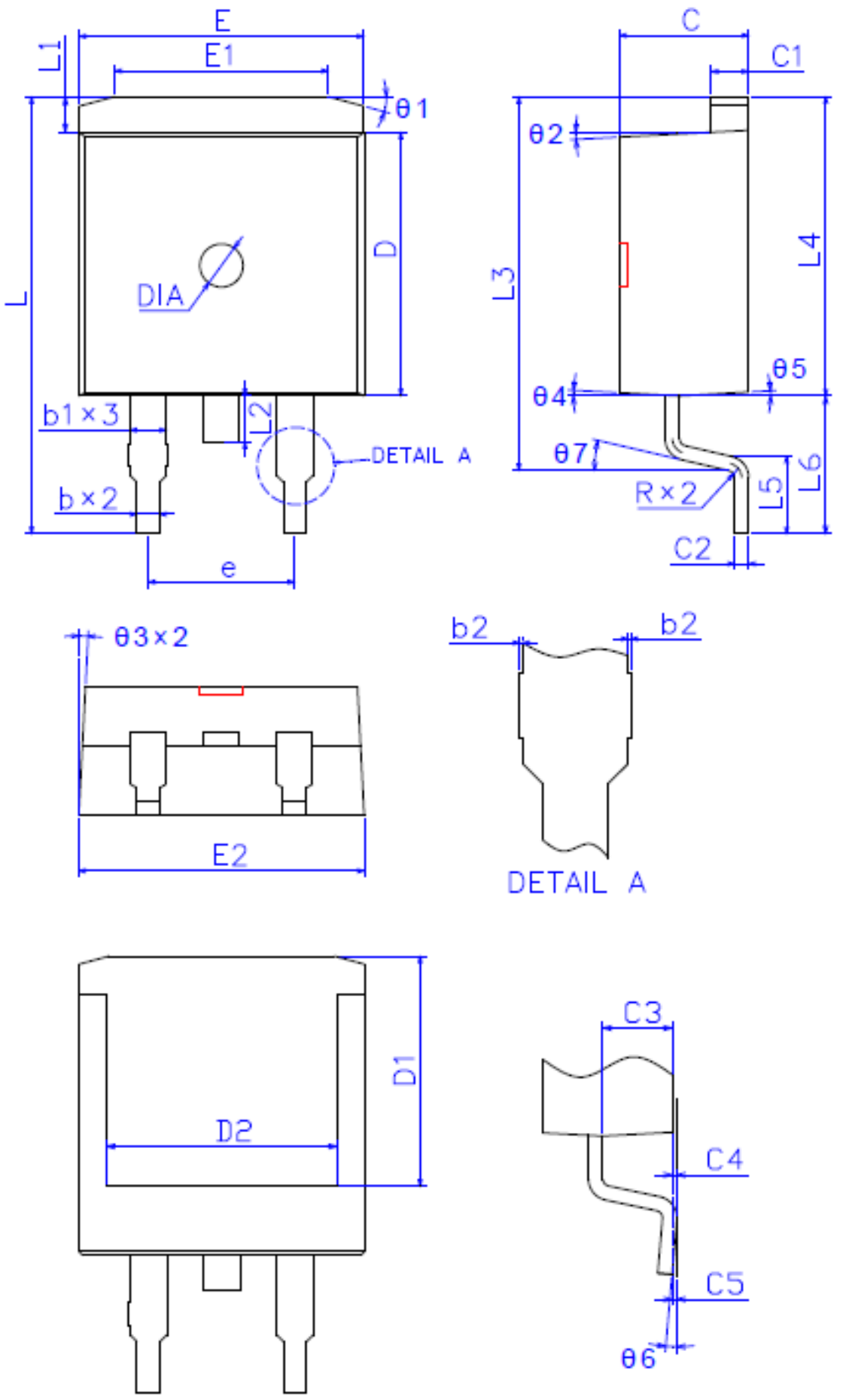
DIM	MILLIMETERS
A	10.00±0.30
A1	8.00±0.30
A2	5.00±0.30
B	13.20±0.40
C	4.50±0.20
C1	1.30±0.20
D	0.80±0.20
E	3.60±0.20
F	3.00±0.30
G	6.60±0.40
H	0.50±0.20
J	28.88±0.50
K	3.00±0.30
M	1.30±0.30
N	Typical 2.54
P	2.40±0.40
Q	9.20±0.40
S	0.25±0.15
T	0.25±0.15
U	2.80±0.30
DIA	宽 1.50±0.10 深 0.50 MAX

（Unit：mm）

外形尺寸：

Package Dimension：

TO-263

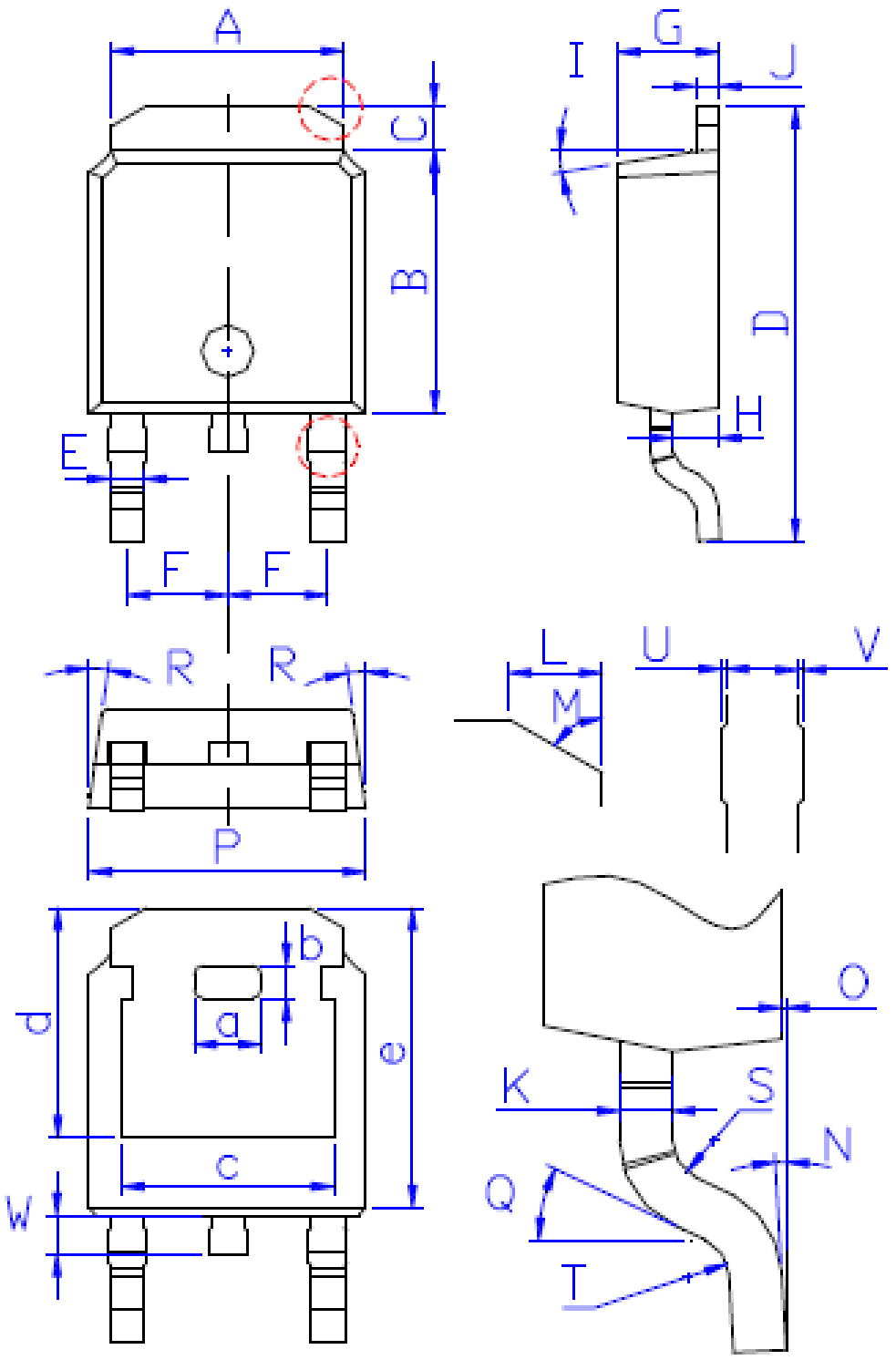


标注	尺寸(mm)
E	9.88±0.10
E1	7.40±0.20
E2	9.90±0.15
L	15.20±0.25
L1	1.30±0.15
L2	1.60±0.10
L3	13.00±0.20
L4	10.40±0.15
L5	2.60±0.15
L6	4.80±0.20
b	0.80±0.07
b1	1.27±0.07
b2	0.05±0.07
C	4.48±0.10
C1	1.30±0.07
C2	0.50±0.07
C3	2.40±0.06
C4	0.10±0.08
C5	0.10±0.08
D	9.20±0.10
D1	8.00±0.10
D2	8.00±0.10
R	0.50±0.10
θ1	15° ±2°
θ2	3° ±2°
θ3	3° ±2°
θ4	3° ±2°
θ5	3° ±2°
θ6	0° ~6°
θ7	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-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)