

# JCS1404

## 主要参数 MAIN CHARACTERISTICS

$I_D$	204 A
$V_{DSS}$	40 V
$R_{dson-max}$ (@ $V_{gs}=10V$ )	4 m $\Omega$
$Q_g-typ$	106nC

### 用途

- 高频开关电源
- UPS 电源

### APPLICATIONS

- High efficiency switch mode power supplies
- UPS

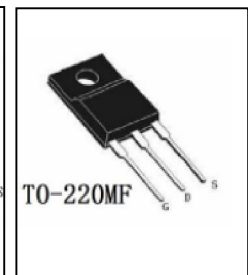
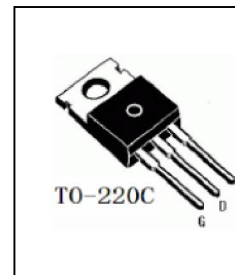
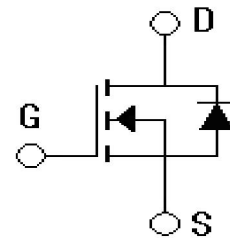
### 产品特性

- 低栅极电荷
- 低  $C_{rss}$  (典型值 235pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

### FEATURES

- Low gate charge
- Low  $C_{rss}$  (typical 235pF)
- Fast switching
- 100% avalanche tested
- Improved  $dv/dt$  capability
- RoHS product

## 封装 Package



## 订货信息 ORDER MESSAGE

订货型号 Order codes	印记 Marking	封装 Package	无卤素 Halogen Free	包装 Packaging	器件重量 Device Weight
JCS1404C-O-C-N-B	JCS1404C	TO-220C	否 NO	条管 Tube	2.06 g(typ)
JCS1404F-O-F-N-B	JCS1404F	TO-220MF	否 NO	条管 Tube	2.22g(typ)

**绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)**

项 目 Parameter	符 号 Symbol	数 值 Value		单 位 Unit
		JCS1404C	JCS1404F	
最高漏极—源极直流电压 Drain-Source Voltage	V <sub>DSS</sub>	40		V
连续漏极电流 Drain Current -continuous	I <sub>D</sub> T=25℃ T=100℃	204*		A
		140*		A
最大脉冲漏极电流 (注1) Drain Current – pulse (note 1)	I <sub>DM</sub>	816*		A
最高栅源电压 Gate-Source Voltage	V <sub>GSS</sub>	±20		V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	E <sub>AS</sub>	1580		mJ
重复雪崩能量 (注1) Repetitive Avalanche Current (note 1)	E <sub>AR</sub>	33.3	6.0	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	1.5		V/ns
耗散功率 Power Dissipation	P <sub>D</sub> T <sub>C</sub> =25℃ -Derate above 25℃	333	60	W
		2.2	0.4	W/℃
最高结温及存储温度 Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~+175		℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T <sub>L</sub>	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
<b>关态特性 Off –Characteristics</b>						
漏—源击穿电压 Drain-Source Voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	40	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$ , referenced to $25^\circ C$	-	0.034	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V, T_C=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=32V, T_C=125^\circ C$	-	-	10	$\mu A$
正向栅极体漏电流 Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=20V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-20V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D=95A$	-	3.5	4	m $\Omega$
栅极电阻 Gate Resistance	$R_G$	$f=1.0MHz, \text{open drain}$		2.5		$\Omega$
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS} = 20V, I_D=95A$ (note 4)	-	104	-	S
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	4280		pF
输出电容 Output capacitance	$C_{oss}$		-	1625		pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	235		pF



**电特性 ELECTRICAL CHARACTERISTICS**

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=20V, I_D=95A, R_G=25\Omega$ $V_{GS}=10V$ (note 4, 5)	-	18	-	ns
上升时间 Turn-On rise time	$t_r$		-	122	-	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	66	-	ns
下降时间 Turn-Off Fall time	$t_f$		-	35	-	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=32V,$ $I_D=95A$ $V_{GS}=10V$ (note 4, 5)	-	106	150	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	47	62	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	11	15	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		$I_S$	-	-	204	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	816	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=95A$	-		1.3	V
反向恢复时间 Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=95A$ $di_f/dt=100A/\mu s$ (note 4)	-	69	-	ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		-	192	-	nC

**热特性 THERMAL CHARACTERISTIC**

项 目 Parameter	符 号 Symbol	最大 Max		单 位 Unit
		JCS1404C	JCS1404F	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.45	2.5	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	62.5	$^{\circ}C/W$

注释:

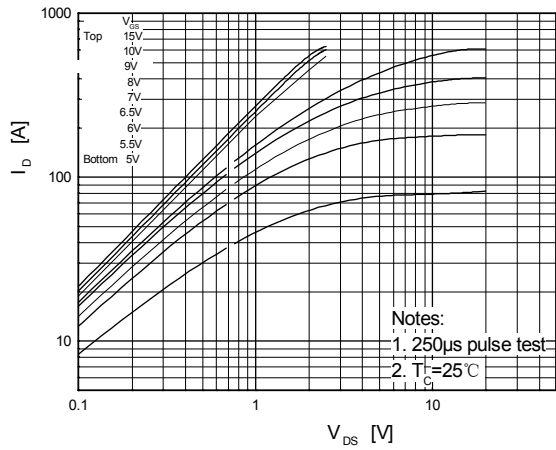
- 1: 脉冲宽度由最高结温限制
- 2:  $L=0.35mH, I_{AS}=95A, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 95A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , 起始结温  $T_J=25^{\circ}C$
- 4: 脉冲测试: 脉冲宽度  $\leq 300\mu s$ , 占空比  $\leq 2\%$
- 5: 基本与工作温度无关

Notes:

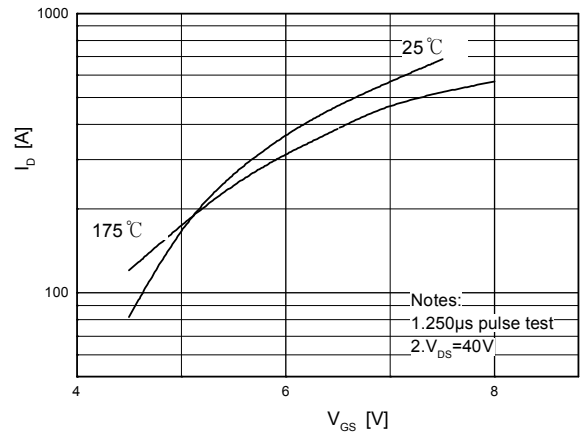
- 1: Pulse width limited by maximum junction temperature
- 2:  $L=0.35mH, I_{AS}=95A, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 95A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycles  $\leq 2\%$
- 5: Essentially independent of operating temperature

特征曲线 ELECTRICAL CHARACTERISTICS (curves)

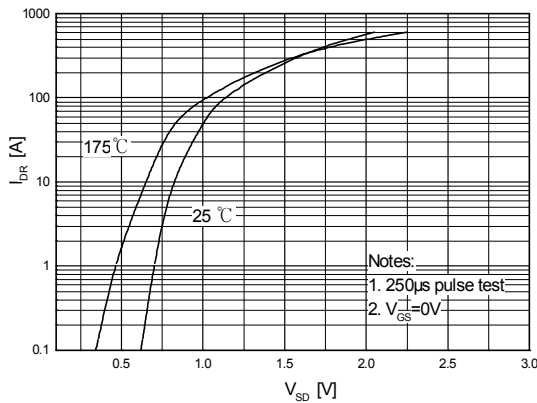
**On-Region Characteristics**



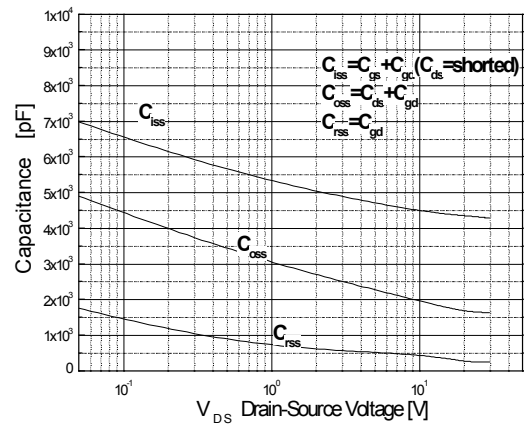
**Transfer Characteristics**



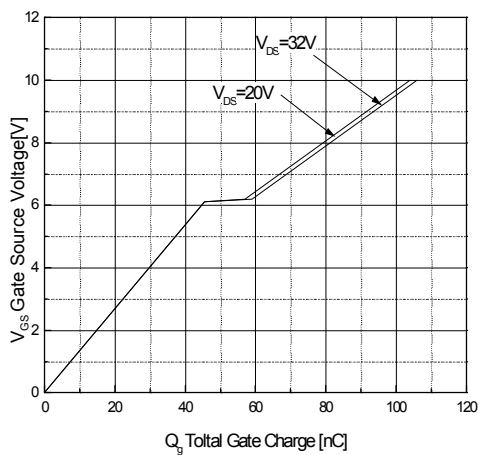
**Body Diode Forward Voltage Variation vs. Source Current and Temperature**



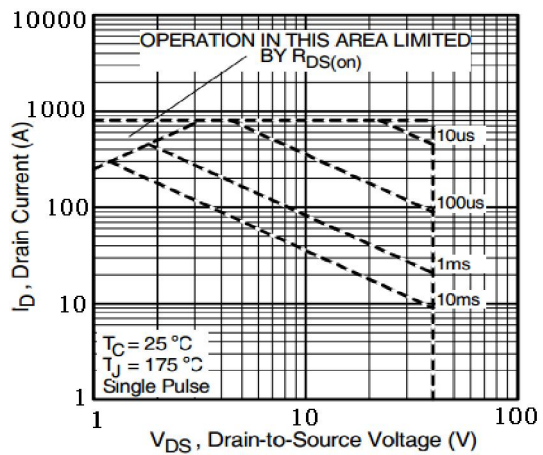
**Capacitance Characteristics**



**Gate Charge Characteristics**

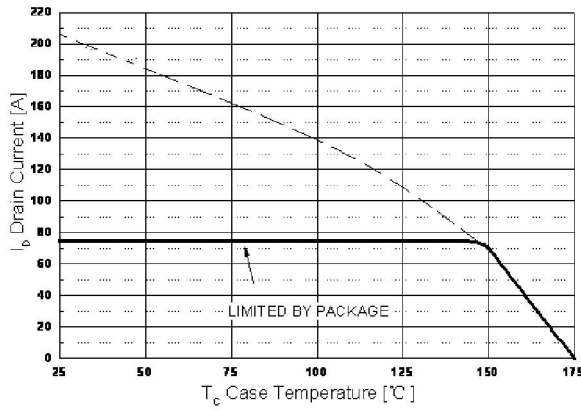


**Maximum Safe Operating Area**

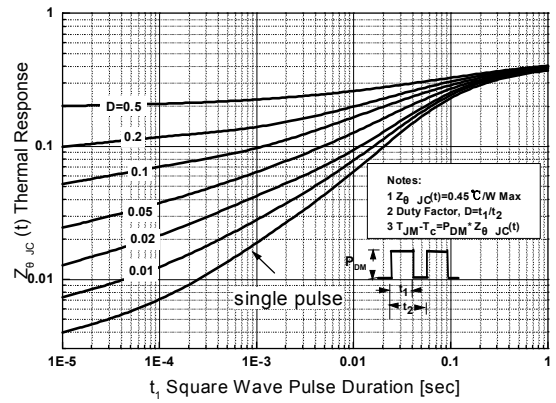


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Maximum Drain Current vs. Case Temperature



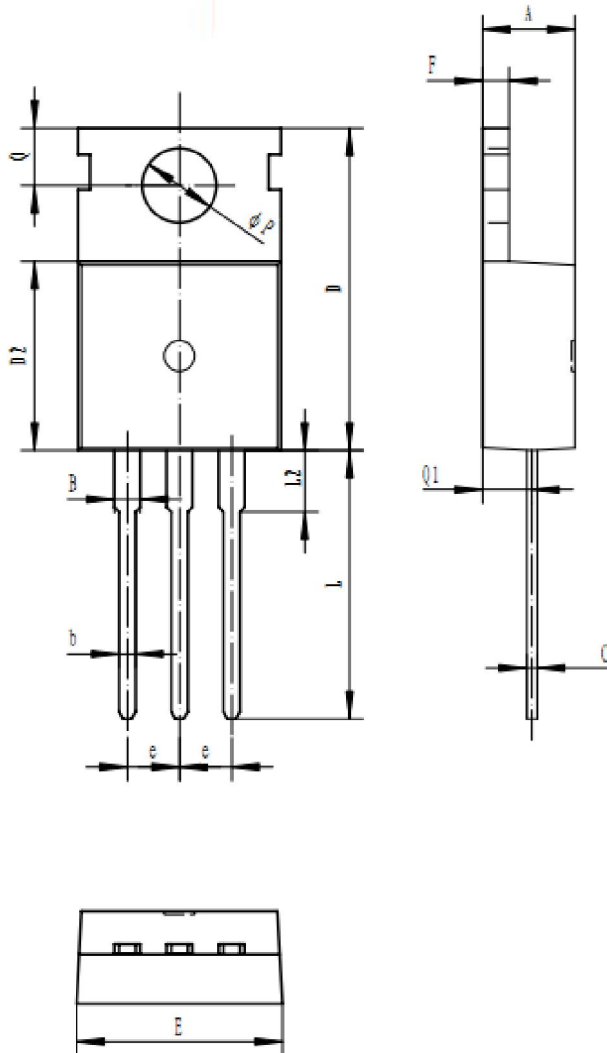
Transient Thermal Response Curve





## TO-220C

单位 Unit: mm



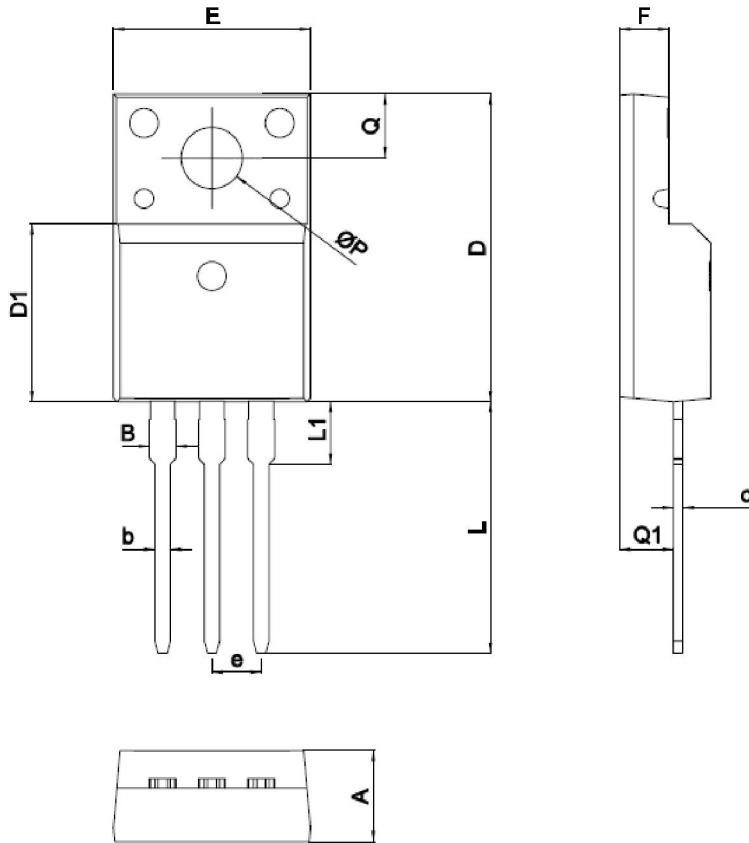
符号 symbol	MIN	MAX
A	4.30	4.70
B	1.22	1.40
b	0.70	0.95
e	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
Q1	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80





TO-220MF

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B		1.47
b	0.7	0.9
c	0.45	0.60
D	15.67	16.07
D1	9.04	9.20
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.58	13.38
L1	3.13	3.33
Q	3.2	3.4
Q1	2.56	2.96
ΦP	3.08	3.28





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**联系方式****吉林华微电子股份有限公司**

公司地址：吉林省吉林市深圳街 99 号

邮编：132013

总机：86-432-64678411

传真：86-432-64665812

网址：[www.hwdz.com.cn](http://www.hwdz.com.cn)

**市场营销部**

地址：吉林省吉林市深圳街 99 号

邮编：132013

电话：86-432-64675588

64675688

64678411

传真：86-432-64671533

**CONTACT****JILIN SINO-MICROELECTRONICS CO., LTD.**

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel: 86-432-64678411

Fax: 86-432-64665812

Web Site: [www.hwdz.com.cn](http://www.hwdz.com.cn)

**MARKET DEPARTMENT**

ADD: No.99 Shenzhen Street, Jilin City, Jilin Province, China.

Post Code: 132013

Tel: 86-432-64675588

64675688

64678411

Fax: 86-432-64671533