



# JCS4AN120A

## 主要参数 MAIN CHARACTERISTICS

ID	4A
VDSS	1200 V
Rdson-max (@Vgs=10V))	4.0Ω
Qg-typ	39nC

### 用途

- 高频开关电源
- 电子镇流器
- UPS 电源

### 产品特性

- 低栅极电荷
- 低 Crss (典型值 98pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗 dv/dt 能力
- RoHS 产品

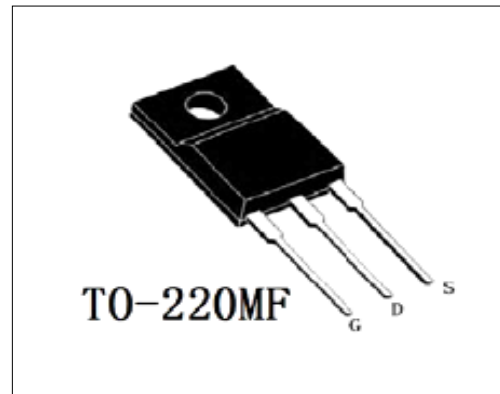
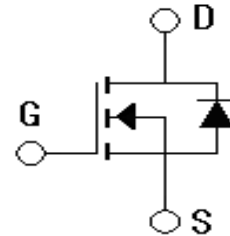
### APPLICATIONS

- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- UPS

### FEATURES

- Low gate charge
- Low Crss (typical 98pF)
- 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
有卤-条管 Halogen-Tube	无卤-条管 Halogen-Free-Tube	有卤-编带 Halogen-Reel	无卤-编带 Halogen-Free-Reel		
JCS4AN120FA-F-B	JCS4AN120FA-F-BR	N/A	N/A	JCS4AN120FA	TO-220MF



绝对最大额定值 ABSOLUTE RATINGS ( $T_C=25^\circ\text{C}$ )

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		JCS4AN120FA	
最高漏极-源极直流电压 Drain-Source Voltage	$V_{DSS}$	1200	V
连续漏极电流 Drain Current -continuous	$I_D$ $T=25^\circ\text{C}$ $T=100^\circ\text{C}$	4*	A
		2.4*	A
最大脉冲漏极电流 (注 1) Drain Current -pulse (note 1)	$I_{DM}$	16*	A
最高栅源电压 Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	$E_{AS}$	83	mJ
雪崩电流 (注 1) Avalanche Current (note 1)	$I_{AR}$	4	A
重复雪崩能量 (注1) Repetitive Avalanche Current (note 1)	$E_{AR}$	11	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	$P_D$ $T_C=25^\circ\text{C}$ -Derate above $25^\circ\text{C}$	48	W
		0.4	
最高结温及存储温度 Operating and Storage Temperature Range	$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	$T_L$	300	$^\circ\text{C}$

\*漏极电流由最高结温限制

\*Drain current limited by maximum junction temperature





## 电特性 ELECTRICAL CHARACTERISTIC

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	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	1200	-	-	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 $25^\circ C$	-	0.5	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=1200V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	10	$\mu A$
		$V_{DS}=1200V, T_C=125^\circ C$	-	-	300	$\mu A$
正向栅极体漏电流 Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	3.0	-	5.0	V
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS} = 30V, I_D=2$ (note 4)	-	4.2	-	S
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D=2A$	-	2.9	4	$\Omega$
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	833	-	pF
输出电容 Output capacitance	$C_{oss}$		-	150	-	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	98	-	pF





## 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>开关特性 Switching –Characteristics</b>						
延迟时间 Turn-On delay time	$t_{d(on)}$	V <sub>DD</sub> =600V	-	29	-	ns
上升时间 Turn-On rise time	$t_r$	I <sub>D</sub> =4A	-	55	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$	V <sub>GS</sub> =10V	-	94	-	ns
下降时间 Turn-Off Fall time	$t_f$	R <sub>G</sub> =25Ω	-	88	-	ns
栅极电荷总量 Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =960V ,	-	39	-	nC
栅—源电荷 Gate-Source charge	Q <sub>gs</sub>	I <sub>D</sub> =4A	-	6	-	nC
栅—漏电荷 Gate-Drain charge	Q <sub>gd</sub>	V <sub>GS</sub> =10V (note 4, 5)	-	25	-	nC
<b>漏—源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings</b>						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current		I <sub>S</sub>	-	-	4	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		I <sub>SM</sub>	-	-	16	A
正向导通压降 Forward on voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =4A	-		1.6	V
反向恢复时间 Reverse recovery time	t <sub>rr</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =4A,		595		ns
反向恢复电荷 Reverse recovery charge	Q <sub>rr</sub>	di <sub>F</sub> /dt=100A/μs (note 4)		4.9		μC

## 热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大值 Value	单 位 Unit
		JCS4AN120FA	
结到管壳的热阻 Thermal Resistance, Junction to Case	R <sub>th(j-c)</sub>	2.6	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	R <sub>th(j-A)</sub>	62.5	°C/W

注:

- 1: 脉冲宽度由最高结温限制
- 2: L=10mH, I<sub>AS</sub>=4.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25 Ω, 起始结温 T<sub>J</sub>=25°C
- 3: I<sub>SD</sub> ≤4A, di/dt ≤200A/μs, V<sub>DD</sub> ≤BV<sub>DSS</sub>, 起始结温 T<sub>J</sub>=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

Notes:

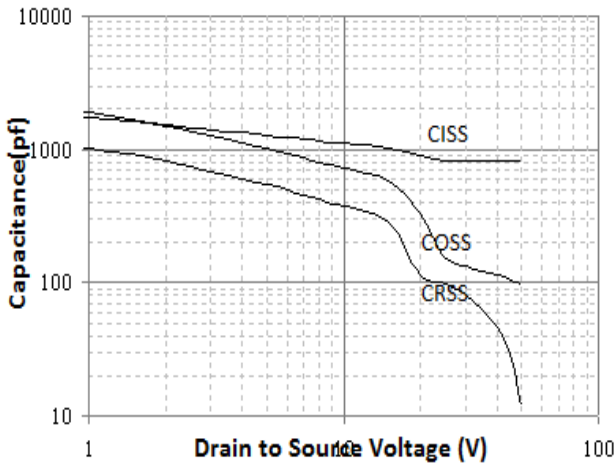
- 1: Pulse width limited by maximum junction temperature
- 2: L=10mH, I<sub>AS</sub>=4.0A, V<sub>DD</sub>=50V, R<sub>G</sub>=25 Ω, =25 Ω, Starting T<sub>J</sub>=25°C
- 3: I<sub>SD</sub> ≤4A, di/dt ≤200A/μs, V<sub>DD</sub> ≤BV<sub>DSS</sub>, Starting T<sub>J</sub>=25°C
- 4: Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%
- 5: Essentially independent of operating temperature



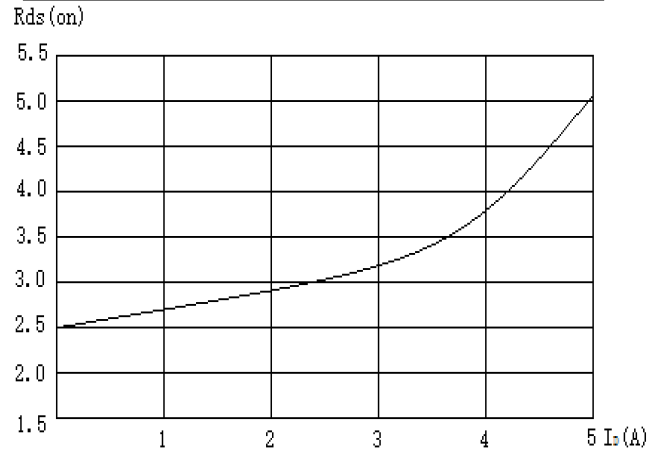


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

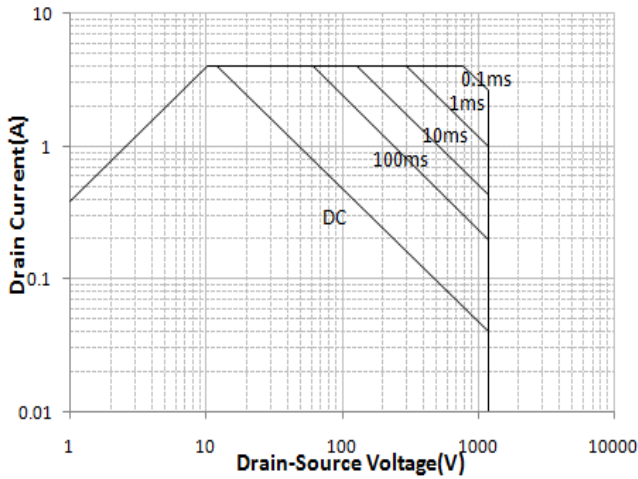
Capacitance Characteristics



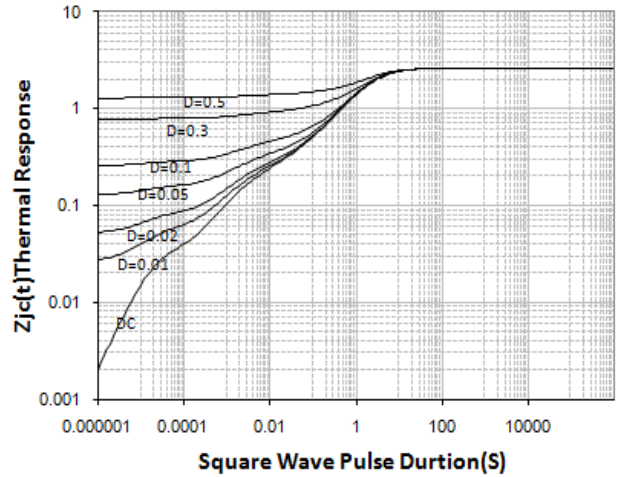
On-Resistance Variation vs. Id



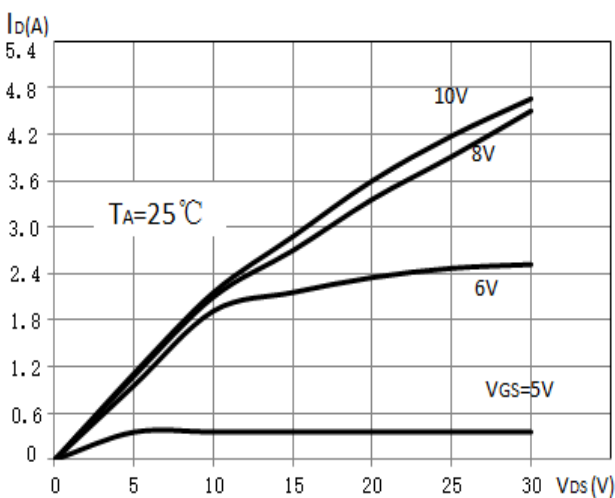
Maximum Safe Operating Area for JCS4AN120FA



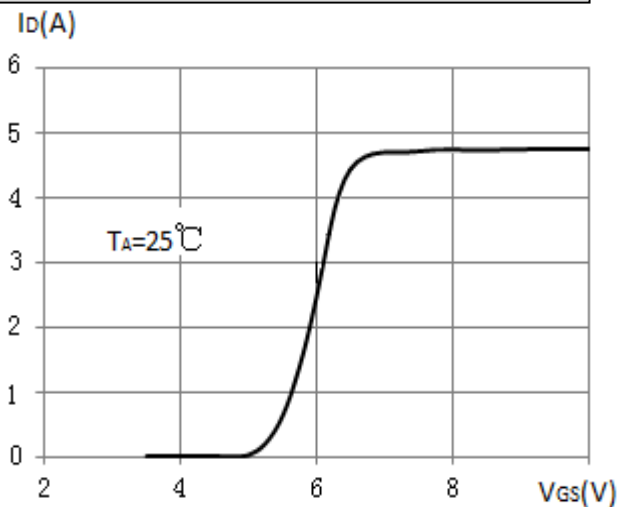
Thermal impedance for JCS4AN120FA



Output characteristics

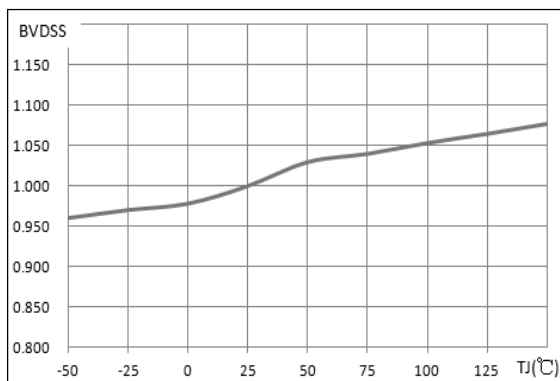


Transfer characteristics

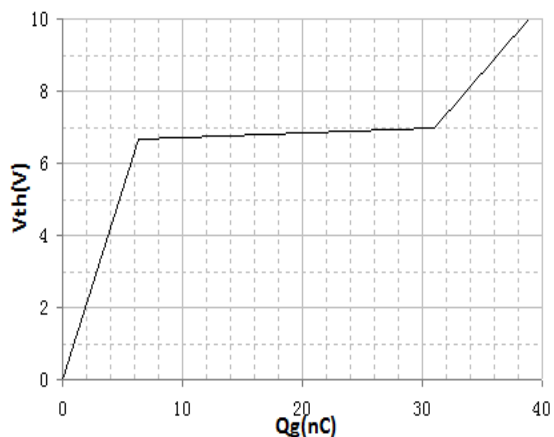




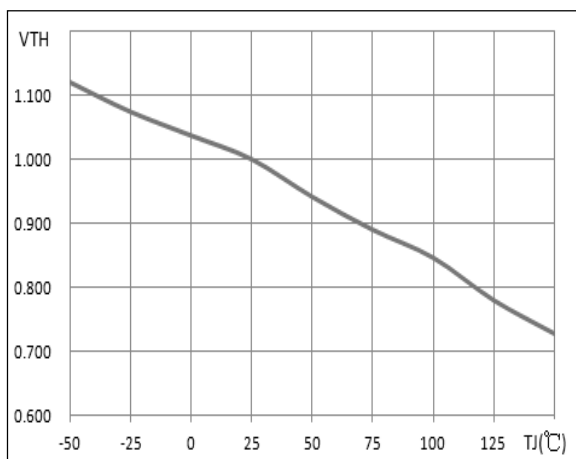
Normalized BV<sub>DSS</sub> vs. temperature



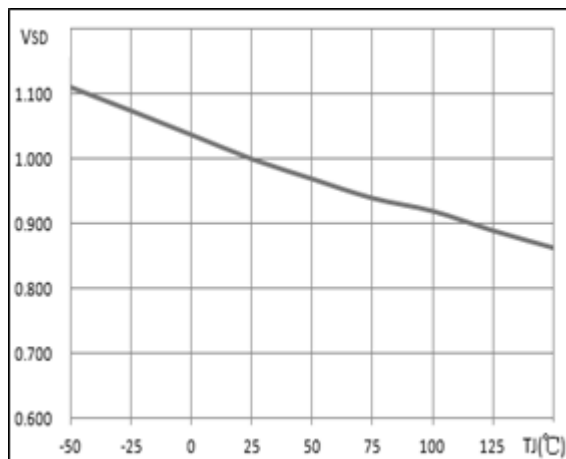
Gate charge vs. V<sub>gs</sub>



Normalized V<sub>TH</sub> vs. temperature



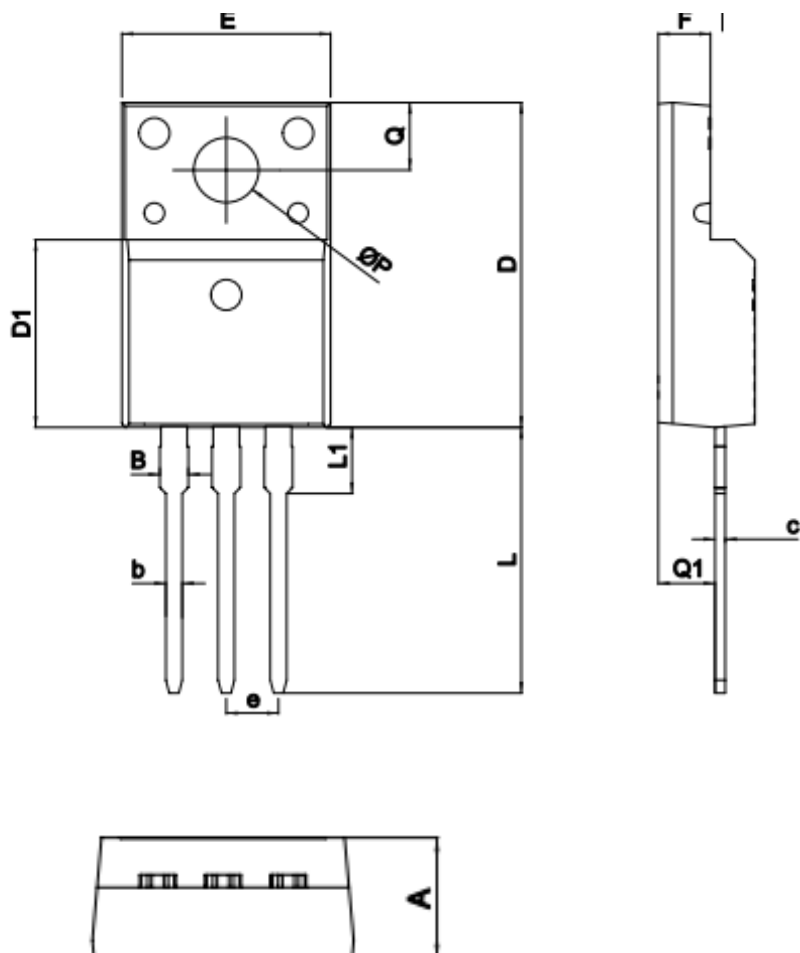
Normalized V<sub>SD</sub> vs. temperature





TO-220MF

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B	1.22	1.47
b	0.7	0.9
c	0.45	0.60
D	15.6	16.1
D1	9.0	9.3
e	2.54TYPE	
E	9.9	10.4
F	2.3	2.8
L	12.6	13.3
L1	3.1	3.4
Q	3.2	3.4
Q1	2.6	2.9
ΦP	3.0	3.5





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