



# JCS20N60FH

## 主要参数MAIN CHARACTERISTICS

$I_D$	20A
$V_{DSS}$	600V
$R_{dson-max}$ ( $V_{GS}=10V$ )	0.39 $\Omega$
$Q_g-Typ$	50nC

### 用途

- 高频开关电源
- 电子镇流器
- LED 电源

### 产品特性

- 低栅极电荷
- 低  $C_{RSS}$  (典型值 12.3pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

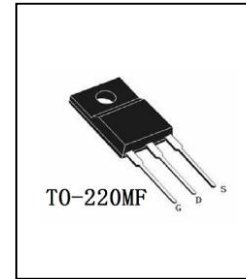
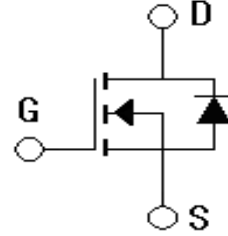
### APPLICATIONS

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

### FEATURES

- Low gate charge
- Low  $C_{RSS}$  (typical 12.3pF)
- 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		
JCS20N60FH-F-B	JCS20N60FH-F-BR	N/A	N/A	JCS20N60FH	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
最高漏极-源极直流电压 Drain-Source Voltage	$V_{DSS}$	600	V
连续漏极电流 Drain Current-continuous	$I_D$ $T=25^\circ\text{C}$ $T=100^\circ\text{C}$	20	A
		12	A
最大脉冲漏极电流 (注1) Drain Current – pulse (note 1)	$I_{DM}$	80	A
最高栅源电压 Gate-Source Voltage	$V_{GSS}$	$\pm 30$	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	$E_{AS}$	450	mJ
雪崩电流 (注1) Avalanche Current (note 1)	$I_{AR}$	20.0	A
重复雪崩能量 (注1) Repetitive Avalanche Current (note 1)	$E_{AR}$	20.7	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	50	V/ns
耗散功率 Power Dissipation	$P_D$ $T_c=25^\circ\text{C}$ -Derate above $25^\circ\text{C}$	55.0	W
		0.31	W/ $^\circ\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_J, T_{STG}$	150; $-55\sim+150$	$^\circ\text{C}$
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 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	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	600	-	-	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°C	-	0.6	-	V/°C
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=600V, V_{GS}=0V, T_C=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=480V, T_C=125^\circ C$	-	-	10	$\mu A$
正向栅极体漏电流 Gate-body leakage current, forward	$I_{GSSF}$	$V_{DS}=0V, V_{GS}=30V$	-	-	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
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10.0A$ 25°C	0.1	0.35	0.39	$\Omega$
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS}=40V, I_D=10.0A$ (note 4)	-	15.4	-	S
<b>动态特性 Dynamic Characteristics</b>						
栅极电阻 Gate resistance	$R_g$	$F=1.0MHz$ open drain	1.2	-	4.5	$\Omega$
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	1200	2310	4200	pF
输出电容 Output capacitance	$C_{oss}$		125	250	650	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		2.5	12.3	30	pF





## 电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=250V, I_D=20A, R_G=25\Omega$ (note 4, 5)	35	106	158	ns
上升时间 Turn-On rise time	$t_r$		35	102	150	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		70	226	345	ns
下降时间 Turn-Off Fall time	$t_f$		20	40.6	100	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=480V,$ $I_D=20A$ $V_{GS}=10V$ (note 4, 5)	15	50	80	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		5	14.3	40	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		7	14.2	40	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		$I_S$	-	-	20	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	80	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V,$ $I_S=20A$	-	-	1.40	V
反向恢复时间 Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=20A$ $di/dt=100A/\mu s$ (note 4)	250	481	1200	ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		2.5	10.6	16	$\mu C$

## 热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	数值 Value	单位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	3.20	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	62.5	$^{\circ}C/W$

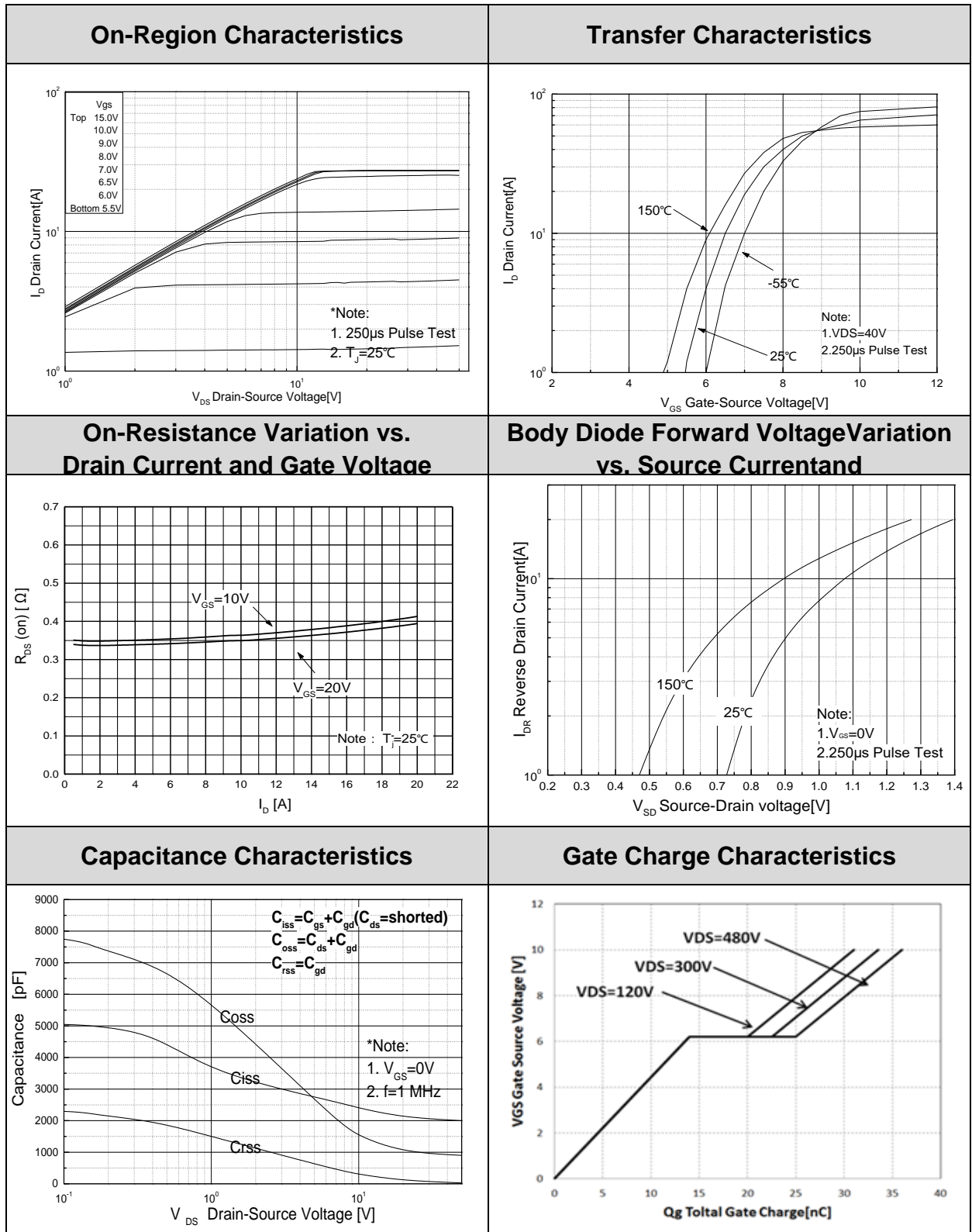
注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $L=5mH, I_{AS}=20A, V_{DD}=50V, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 20A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , 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

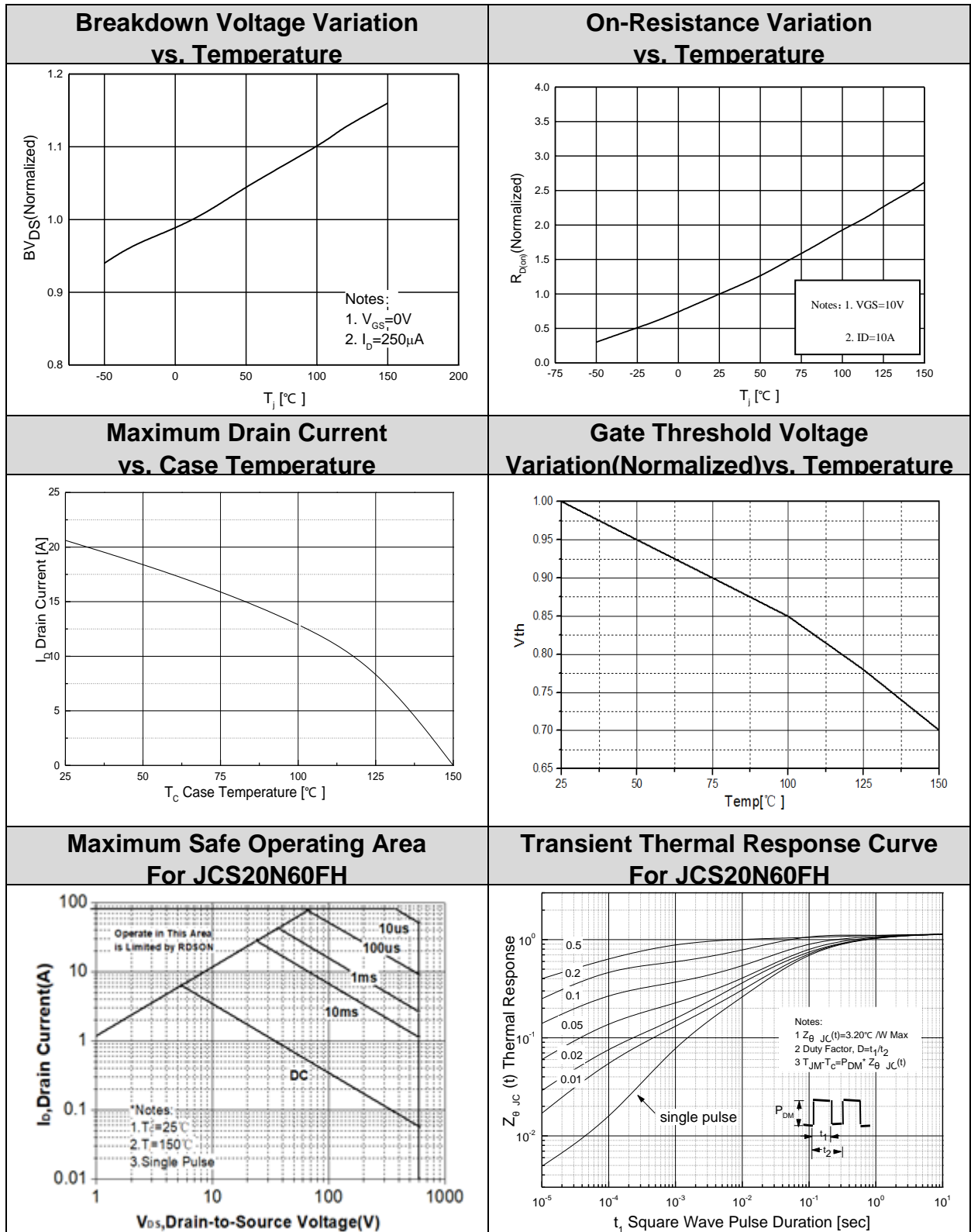
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2:  $L=5mH, I_{AS}=20A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 20A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , 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)



特征曲线ELECTRICAL CHARACTERISTICS (curves)

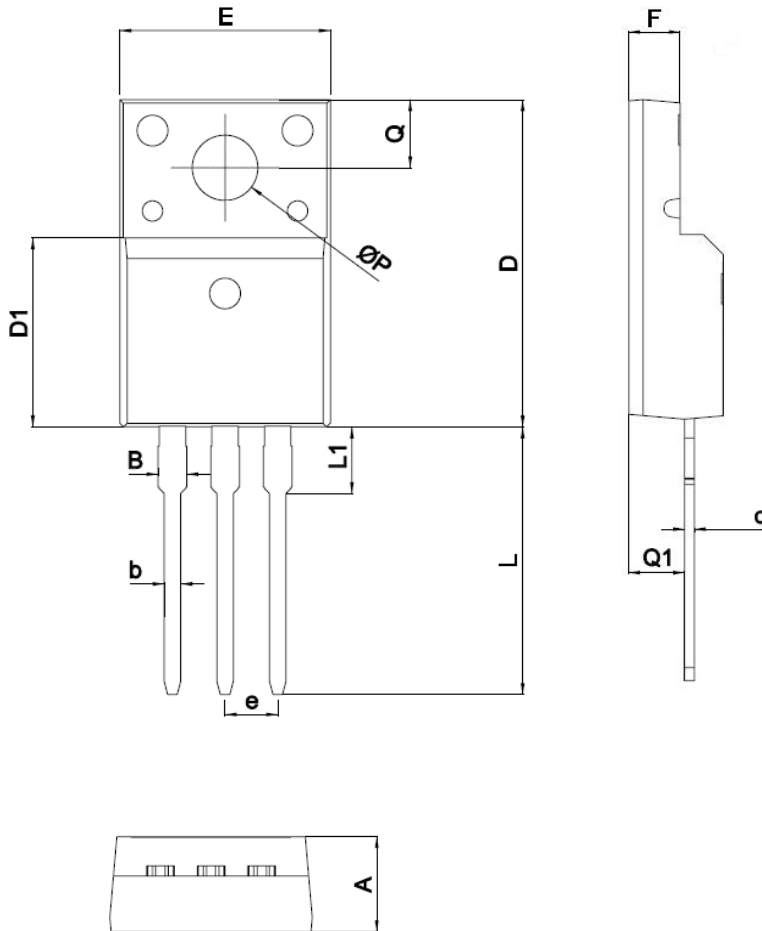




外形尺寸 PACKAGE MECHANICAL DATA

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
$\Phi P$	3.08	3.28



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