



# JCS33N25CT

## 主要参数 MAIN CHARACTERISTICS

$I_D$	33A
$V_{DSS}$	250V
$R_{DS(on)-max}$ (@ $V_{GS}=10V$ )	120m $\Omega$
$Q_G-typ$	46.3nC

### 用途

- 高频开关电源
- 电子镇流器
- UPS 电源

### APPLICATIONS

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

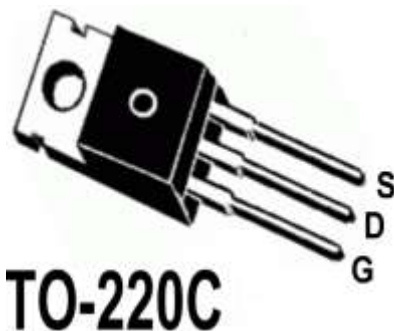
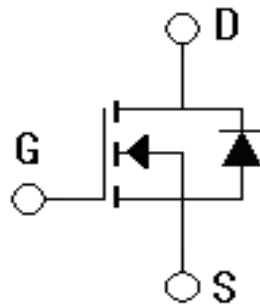
### 产品特性

- 低栅极电荷
- 低  $C_{RSS}$  (典型值 55.2pF)
- 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 55.2pF)
- 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		
JCS33N25CT-C-B	JCS33N25CT-C-BR	N/A	N/A	JCS33N25C	TO-220C

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
		JCS33N25CT	
最高漏极-源极直流电压 Drain-Source Voltage	$V_{DSS}$	250	V
连续漏极电流 Drain Current -continuous	$I_D$ $T=25^\circ\text{C}$ $T=100^\circ\text{C}$	33*	A
		12.6*	A
最大脉冲漏极电流（注1） Drain Current -pulse (note 1)	$I_{DM}$	132*	A
最高栅源电压 Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
单脉冲雪崩能量 Single Pulsed Avalanche Energy	$E_{AS}$	884	mJ
雪崩电流（注1） Avalanche Current (note 1)	$I_{AR}$	33	A
重复雪崩能量（注1） Repetitive Avalanche Current (note 1)	$E_{AR}$	15.2	
耗散功率 Power Dissipation	$P_D$ $T_C=25^\circ\text{C}$ -Derate above $25^\circ\text{C}$	152	W
		1.22	W/ $^\circ\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_J, T_{STG}$	$-55\sim+150$	$^\circ\text{C}$
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 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	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	250	-	-	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 $25^\circ C$	-	0.26	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=250V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=200V, T_C=125^\circ C$	-	-	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
正向跨导 Forward Transconductance	$G_{fs}$	$V_{DS} = 40V, I_D=33A$ (note 3)	-	14.1	-	S
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D=16.5A$	-	100	120	m $\Omega$
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	1615	2423	pF
输出电容 Output capacitance	$C_{oss}$		-	369	554	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	55.2	83	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	$t_{d(on)}$	$V_{DD}=125V,$ $I_D=33A,$ $V_{GS}=10V$ $R_G=25\Omega$ (note 3, 4)	-	22.2	33.3	ns
上升时间 Turn-On rise time	$t_r$		-	94	141	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	67.4	101	ns
下降时间 Turn-Off Fall time	$t_f$		-	57.2	85	ns
栅极电荷总量 Total Gate Charge	$Q_G$	$V_{DS}=200V,$	-	46.3	58	nC
栅-源电荷 Gate-Source charge	$Q_{GS}$	$I_D=33A$	-	12.5	-	nC
栅-漏电荷 Gate-Drain charge	$Q_{GD}$	$V_{GS}=10V$ (note 3, 4)	-	28	-	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		$I_S$	-	-	33	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	132	A
正向导通压降 Forward on voltage	$V_{SD}$	$V_{GS}=0V, I_S=33A$	-		1.4	V
反向恢复时间 Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=33A,$ $di/dt=100A/\mu s$ (note 3)		232		ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$			2.06		$\mu C$

## 热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大值 Value	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.82	$^{\circ}C/W$
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:  $L=1.30mH, I_{AS}=33A, V_{DD}=50V, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 40A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , 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

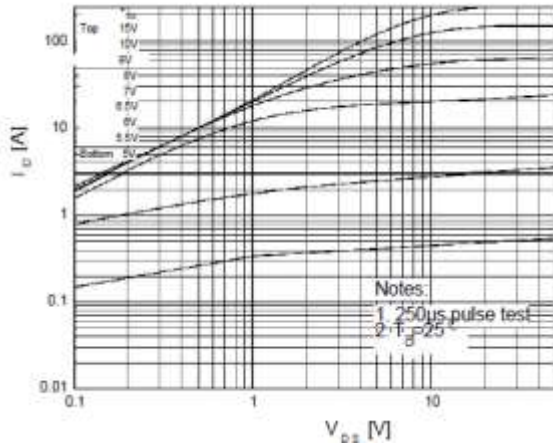
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2:  $L=1.30mH, I_{AS}=33A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 40A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
- 5: Essentially independent of operating temperature

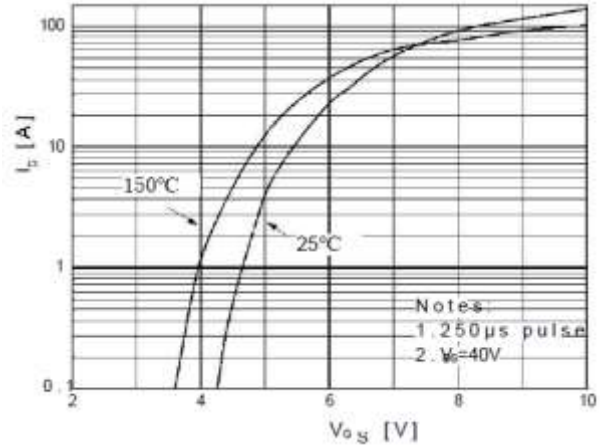


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

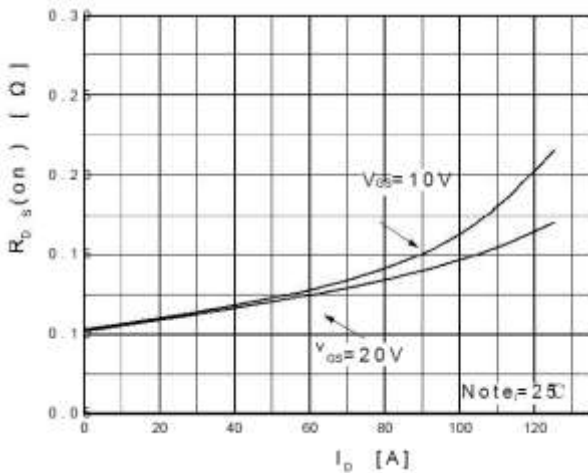
Output characteristics



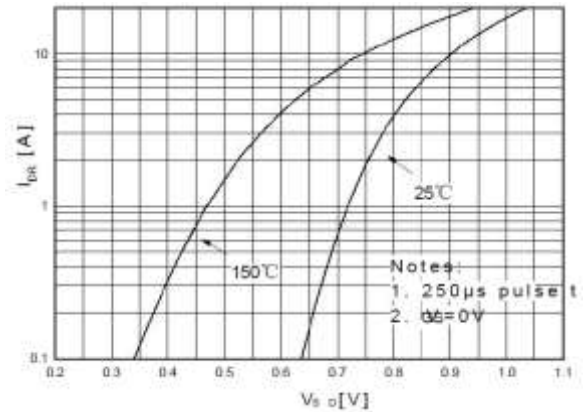
Transfer characteristics



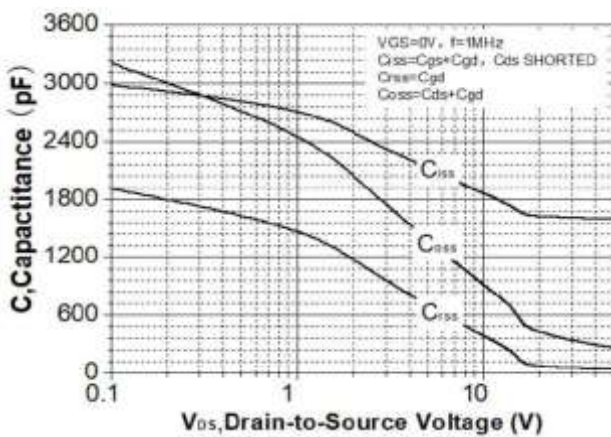
On-Resistance Variation vs. Id



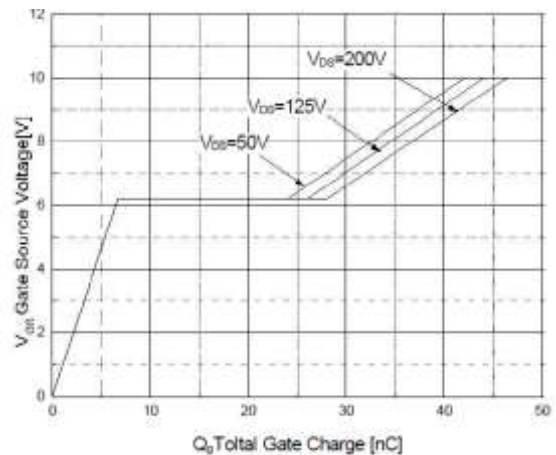
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics



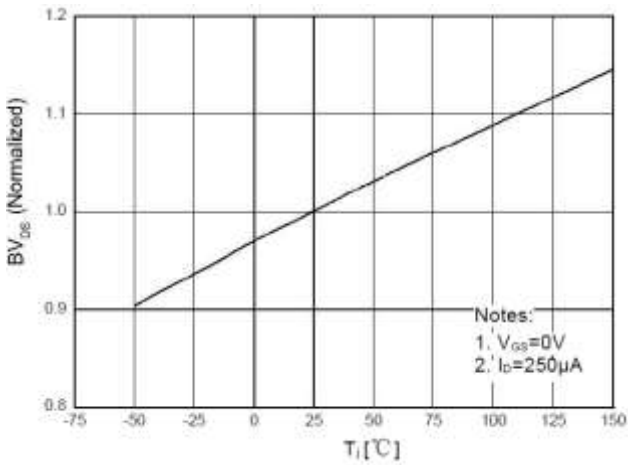
Gate charge vs. Vgs



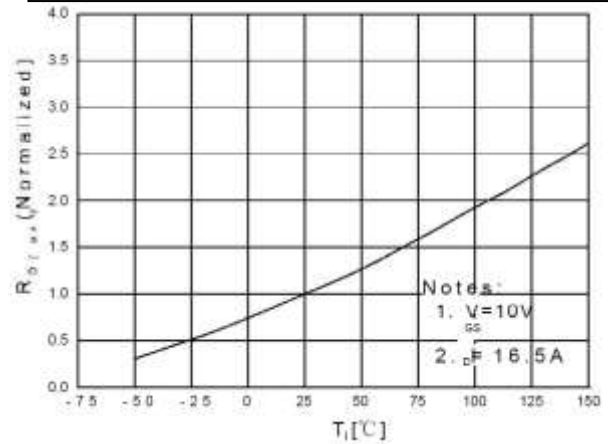


### 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

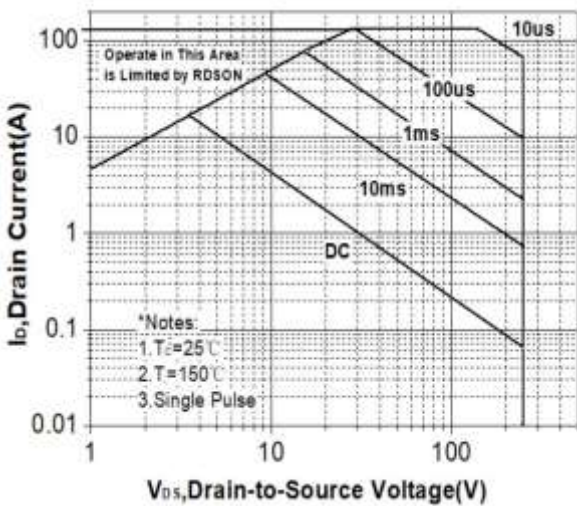
Normalized BV<sub>DS</sub> vs. temperature



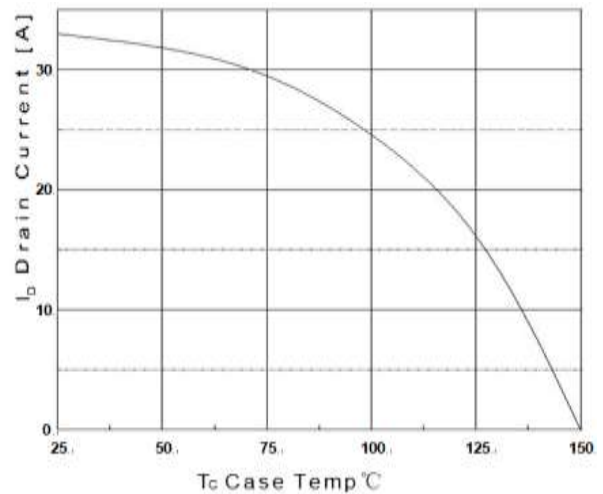
On-Resistance Variation vs. Temperature



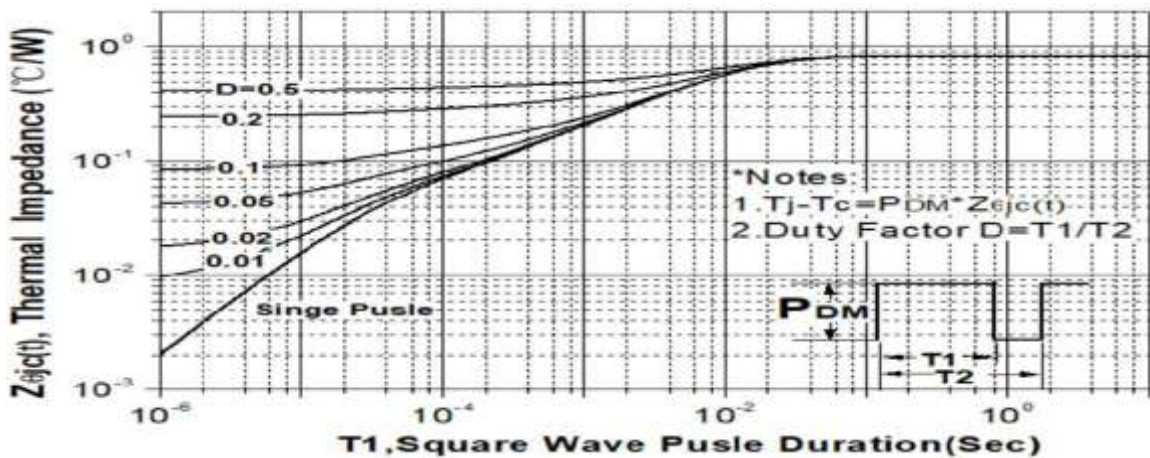
Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



Thermal impedance

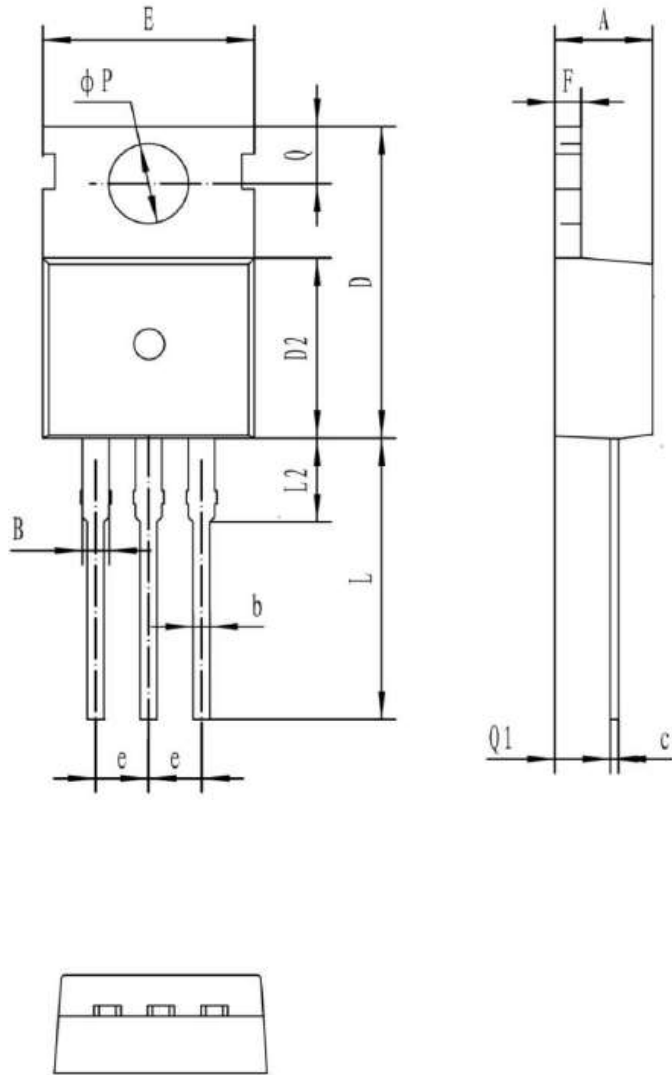




外形尺寸 PACKAGE MECHANICAL DATA

TO-220C

单位 Unit : mm



符号 symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	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
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80



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