



JCS13AN50CR

主要参数 MAIN CHARACTERISTICS

I_D	13.0 A
V_{DS}	500 V
$R_{DS(on)}$ ($V_{GS}=10V$) -MAX	0.55 Ω
Q_g -Typ	33.15

用途

- 高频开关电源.
- 电子镇流器
- LED 电源

APPLICATIONS

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

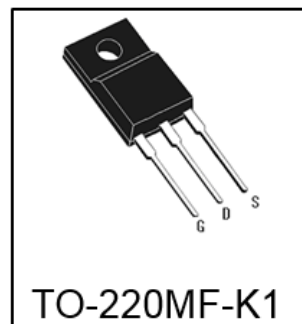
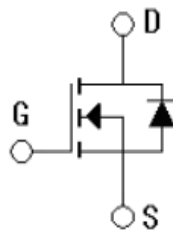
产品特性

- 平面 MOS
- 低 C_{rss} (典型值 28pF)
- 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

- Planar MOS
- Low C_{rss} (typical 28pF)
- 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		
JCS13AN50FCR-F1-B	JCS13AN50FCR-F1-BR	N/A	N/A	JCS13AN50FCR	TO-220MF-K1



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
		JCS13AN50FCR	Unit
最高漏极-源极直流电压 Drain-Source Voltage	V_{DSS}	500	V
连续漏极电流 Drain Current -continuous	I_{D} $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	13.0	A
		7.8	A
最大脉冲漏极电流 (注 1) Drain Current - pulse (note 1)	I_{DM}	52	A
最高栅源电压 Gate-Source Voltage	V_{GSS}	± 30	V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E_{AS}	380	mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I_{AR}	13	A
重复雪崩能量 (注 1) Repetitive Avalanche Current (note 1)	E_{AR}	65	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	1.4	V/ns
耗散功率($T_c=25^{\circ}\text{C}$) Power Dissipation	P_{D} $T_c=25^{\circ}\text{C}$ -Derate above 25°C	45	W
		0.36	W/ $^{\circ}\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_{\text{J}}, T_{\text{STG}}$	$-55 \sim +150$	$^{\circ}\text{C}$

*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
关态特性 Off –Characteristics						
漏—源击穿电压 Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	500	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to $25^\circ C$	-	4.0		$V/^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	5	μA
		$V_{DS}=400V, T_C=125^\circ C$	-	-	10	μA
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
通态特性 On-Characteristics						
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=6.5A$	-	0.38	0.55	Ω
正向跨导 Forward Transconductance	g_{fs}	$V_{DS}=40V, I_D=13A$ (note 4)	-	17.8	-	S
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	1222	1654	pF
输出电容 Output capacitance	C_{oss}		-	177	255	pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	28	41	pF





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	Vdd=250V , Id=13A, Vgs=10V , RG=25Ω (note 4, 5)	-	16.2	35.4	ns
上升时间 Turn-On rise time	t_r		-	45.2	65.4	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	113.8	206.6	ns
下降时间 Turn-Off Fall time	t_f		-	71.4	105.6	ns
栅极电荷总量 Total Gate Charge	Q_g	Vds=400V, Vgs=10V, Id=13A (note 4, 5)	-	33.15	50.15	nC
栅—源电荷 Gate-Source charge	Q_{gs}		-	6.99	18.40	nC
栅—漏电荷 Gate-Drain charge	Q_{gd}		-	14.1	21.9	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		-	-	13	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	52	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, \quad I_S=13.0A$	-	-	1.5	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_{GS}=0V, \quad I_S=13.0A$ $dI_F/dt=100A/\mu s$ (note 4)	-	115.9	-	ns
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	226.6	-	nC

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max	单位 Unit
		JCS13AN50FCR	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	2.67	$^{\circ}C/W$
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: $L=4.5mH, I_{AS}=13, V_{DD}=100V, R_G=25\Omega$, 起始结温
 $T_J=25^{\circ}C$
- 3: $I_{SD}\leq 13A, di/dt\leq 200A/\mu s, V_{DD}\leq BVDSS$, 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:

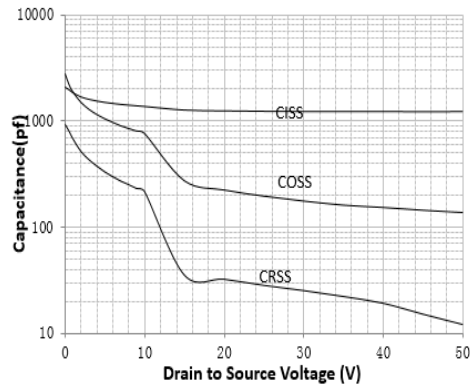
- 1: Pulse width limited by maximum junction temperature
- 2: $L=4.5mH, I_{AS}=13A, V_{DD}=100V, R_G=25\Omega$, Starting
 $T_J=25^{\circ}C$
- 3: $I_{SD}\leq 13A, di/dt\leq 200A/\mu s, V_{DD}\leq BVDSS$, Starting
 $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 5: Essentially independent of operating temperature



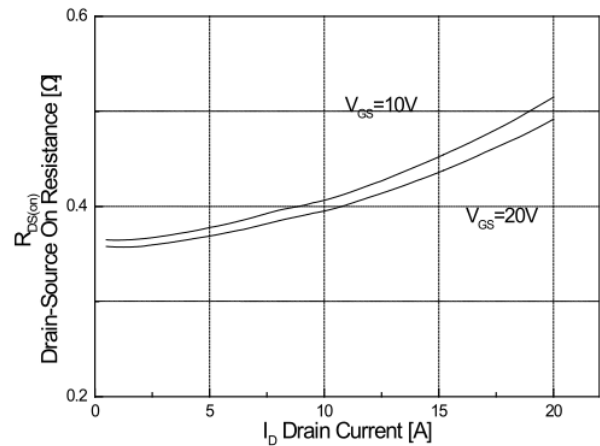


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

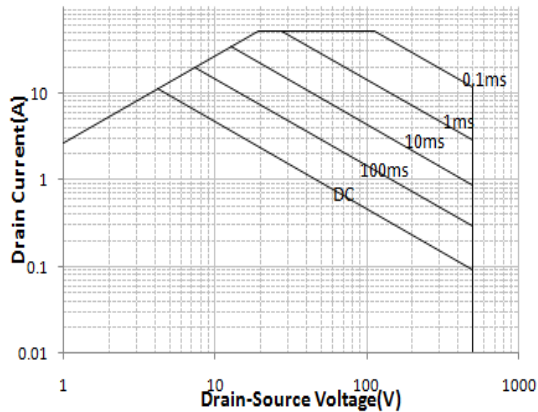
Capacitance Characteristics



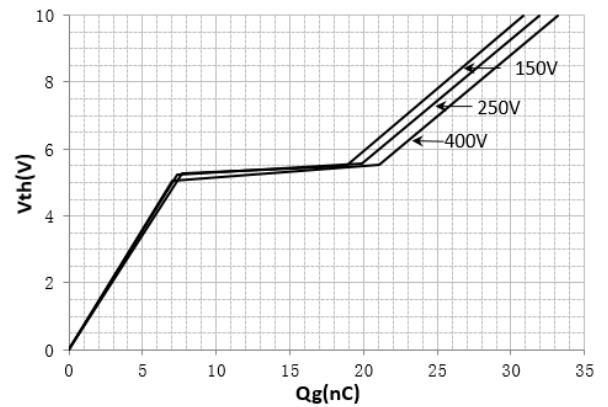
On-Resistance Variation vs. I_D



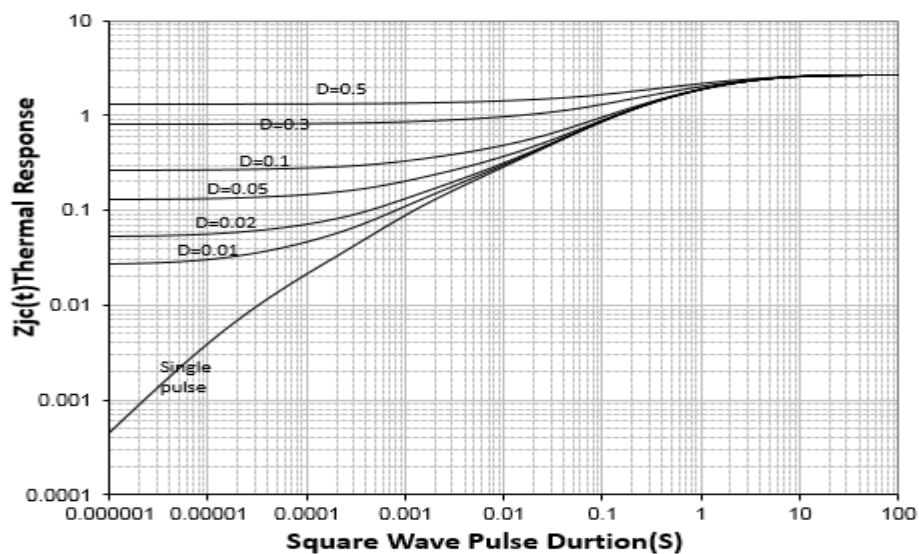
Maximum Safe Operating Area for JCS13AN50FCR

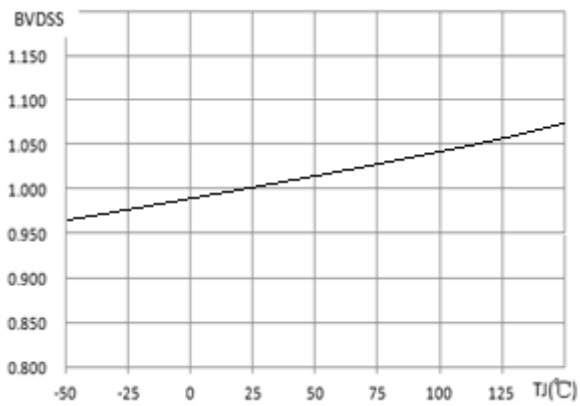
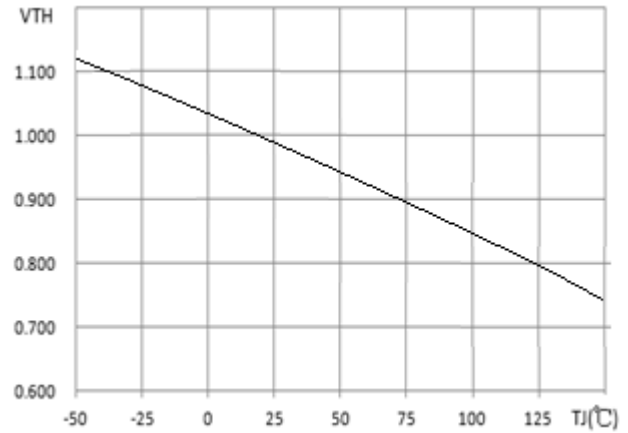
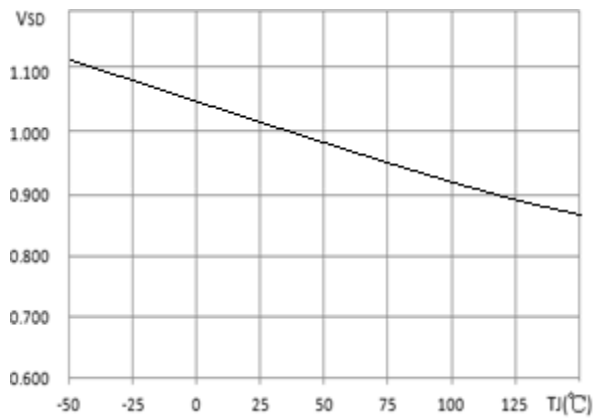


Gate charge Characteristics



Thermal impedance for JCS13AN50FCR

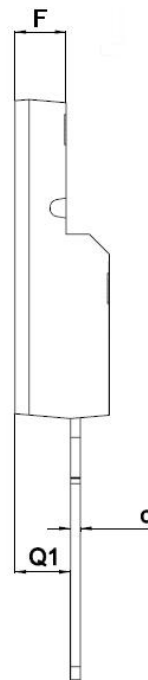
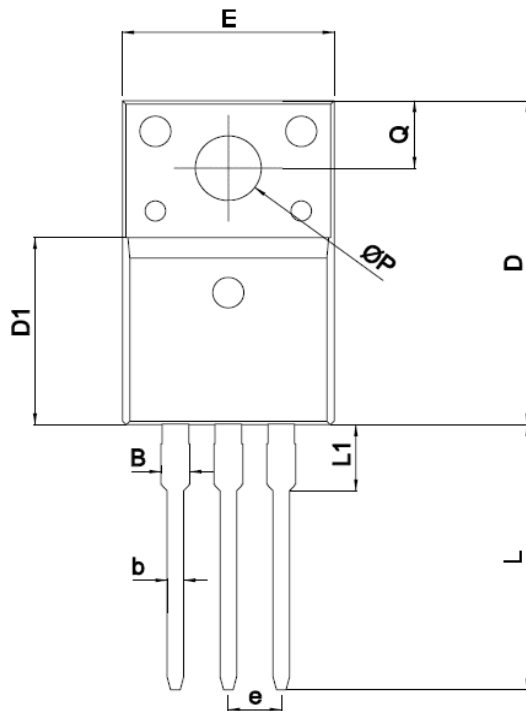


Normalized BV_{DS} vs. temperatureNormalized V_{TH} vs. temperatureNormalized V_{SD} vs. temperature



TO-220MF-K1

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





注意事项

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