



# MC70N10A

## 主要参数 MAIN CHARACTERISTICS

$I_D$	40A
$V_{DSS}$	100V
$R_{dson-max}$ (@ $V_{gs}=10V$ )	13.5m $\Omega$
$Q_g-typ$	27.8nC

### 用途

- 电信与工业领域隔离 DC/DC 转换
- 同步整流领域 DC/DC 与 AC/DC 转换

### 产品特性

- 低栅极电荷
- 低  $R_{dson}$
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

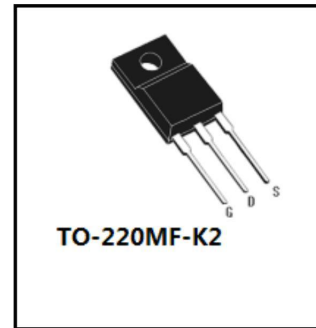
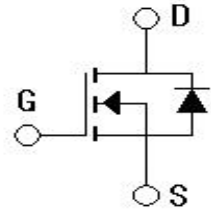
### APPLICATIONS

- Isolated DC/DC Converters in Telecom and Industrial
- Synchronous Rectification in DC/DC and AC/DC Converters

### FEATURES

- Low gate charge
- Low  $R_{dson}$
- 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		
MC70N10A-F2-B	MC70N10A-F2-BR	N/A	N/A	MC70N10A	TO-220MF-K2





## 绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
		MC70N10A	
最高漏极-源极直流电压 Drain-Source Voltage	V <sub>DSS</sub>	100	V
连续漏极电流 Drain Current -continuous	I <sub>D</sub> T=25°C	40*	A
	I <sub>D</sub> T=100°C	32*	A
最大脉冲漏极电流 (注1) Drain Current - pulse (note 1)	I <sub>DM</sub>	160*	A
最高栅源电压 Gate-Source Voltage	V <sub>GSS</sub>	+20/-12	V
单脉冲雪崩能量 (注2) Single Pulsed Avalanche Energy (note 2)	E <sub>AS</sub>	115	mJ
雪崩电流 (注1) Avalanche Current (note 1)	I <sub>AS</sub>	48	A
耗散功率 Power Dissipation	P <sub>D</sub> T <sub>C</sub> =25°C -Derate above 25°C	36.8	W
		0.29	W/°C
最高结温及存储温度 Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~+150	°C
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T <sub>L</sub>	300	°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	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	100	-	-	V
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V,$ $T_C=125^\circ C$	-	-	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	$I_{GSSR}$	$V_{DS}=0V, V_{GS}=-12V$	-	-	-100	nA
<b>通态特性 On-Characteristics</b>						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D=20A$	-	11.4	13.5	m $\Omega$
		$V_{GS} = 4.5V, I_D=15A$	-	15.6	20	m $\Omega$
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS} = 10V, I_D=3A$ (note 4)	-	12	-	S
<b>动态特性 Dynamic Characteristics</b>						
栅电阻 Gate resistance	$R_g$	$V_{DS}=0V, V_{GS}=0V, f=1.0MHz$	-	1.14	-	$\Omega$
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=50V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	1640	-	pF
输出电容 Output capacitance	$C_{oss}$		-	240	-	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	4	-	pF



**电特性 ELECTRICAL CHARACTERISTICS**

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{DD}=50V, I_D=1A, R_G=6.0\Omega,$ $V_{GS}=10V$ (note 3, 4)	-	14.2	-	ns
上升时间 Turn-On rise time	$t_r$		-	20.8	-	ns
延迟时间 Turn-Off delay time	$t_{d(off)}$		-	42	-	ns
下降时间 Turn-Off Fall time	$t_f$		-	30	-	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=50V,$ $I_D=10A$ $V_{GS}=10V$ (note 3, 4)	-	27.8	-	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	3.5	-	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	8.8	-	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	$I_S$	$T_C=25^\circ C$	-	-	40	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$	$T_C=25^\circ C$	-	-	160	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ C, V_{GS}=0V, I_S=1A$	-	-	1.0	V
反向恢复时间 Reverse recovery time	$t_{rr}$	$I_S=10A, T_J=25^\circ C$ $dI_F/dt=100A/\mu s$ (note 3)	-	43.5	-	ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		-	59.6	-	nC

**热特性 THERMAL CHARACTERISTIC**

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
		MC70N10A	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	3.4	$^\circ C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	50	$^\circ C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $I_{AS}=48A, V_{DD}=50V, V_{GS}=10V, L=0.1mH, R_G=25\Omega$ , 起始结温  $T_J=25^\circ C$
- 3: 脉冲测试: 脉冲宽度 $\leq 300\mu s$ , 占空比 $\leq 2\%$
- 4: 基本与工作温度无关

Notes:

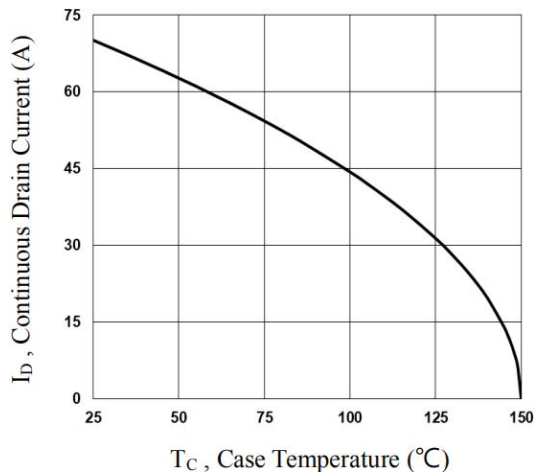
- 1: Pulse width limited by maximum junction temperature
- 2:  $I_{AS}=48A, V_{DD}=50V, V_{GS}=10V, L=0.1mH, R_G=25\Omega$ , Starting  $T_J=25^\circ C$
- 3: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
- 4: Essentially independent of operating temperature



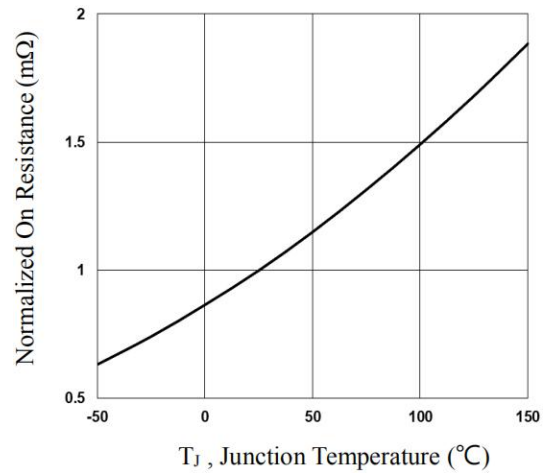


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

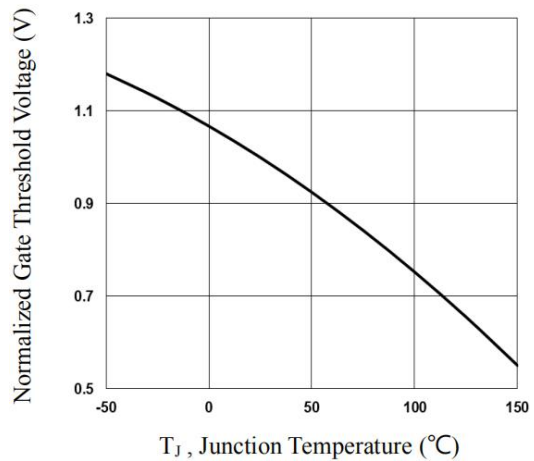
Drain Current Variation vs. Temperature



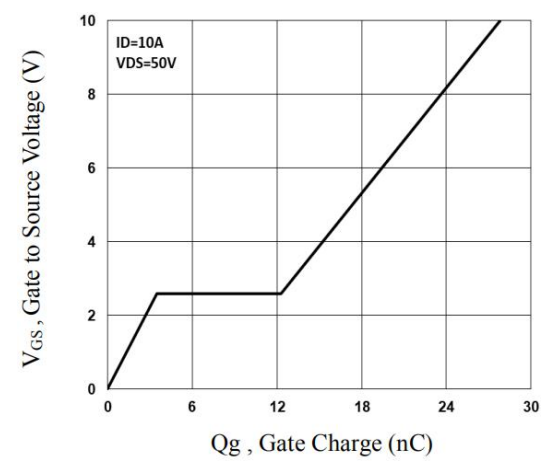
On-Resistance Variation vs. Temperature



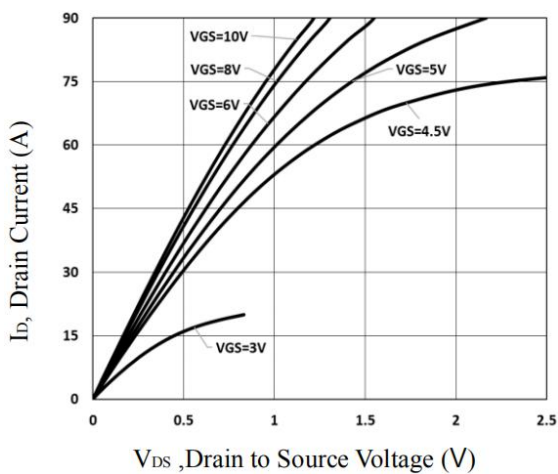
Gate Threshold Voltage Variation vs. Temperature



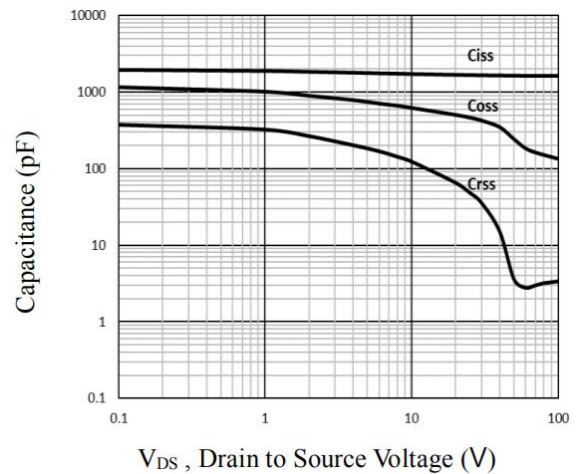
Gate Charge Characteristics



On-Region Characteristics



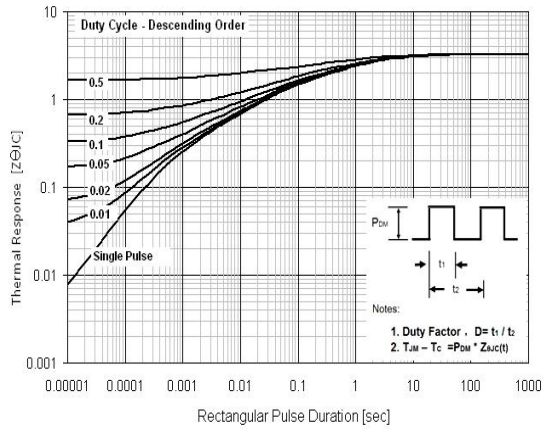
Capacitance Characteristics



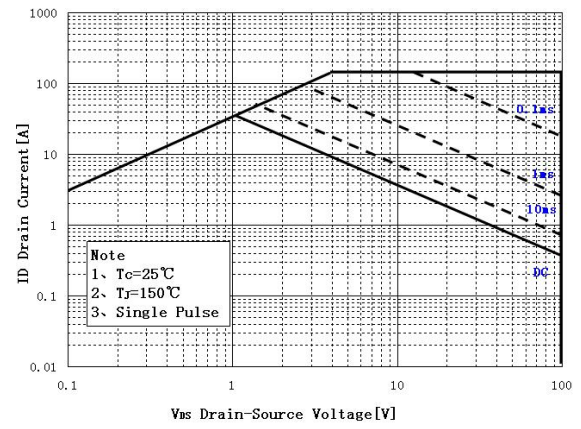


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

Transient Thermal Response Curve



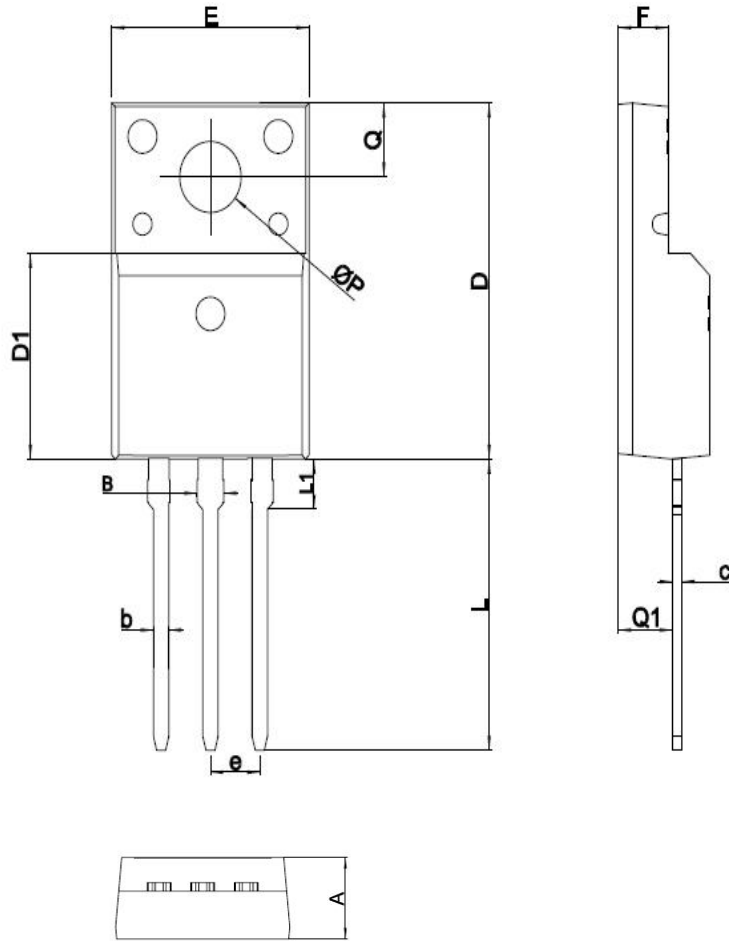
Maximum Safe Operation Area





## TO-220MF-K2

单位 Unit: mm



SYMBOL	mm	
	MIN	MAX
A	4.5	4.9
B		1.27
b	0.59	0.79
c	0.45	0.60
D	15.67	16.07
D1	8.97	9.37
e	2.54TYPE	
E	9.96	10.36
F	2.34	2.74
L	12.65	13.35
L1	1.80	2.20
Q	3.2	3.4
Q1	2.56	2.96
ΦP	3.08	3.28



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