



# JCS4N70C

## 主要参数 MAIN CHARACTERISTICS

$I_D$	4.0 A
$V_{DSS}$	700 V
$R_{dson} (V_{gs}=10V)$	2.8 $\Omega$
$Q_g$	14nC

### 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  $C_{rss}$  (典型值 14pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗  $dv/dt$  能力
- RoHS 产品

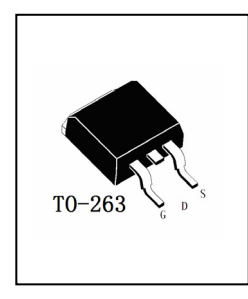
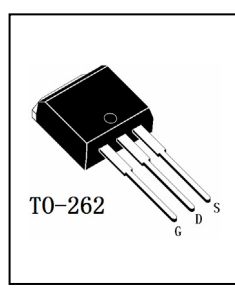
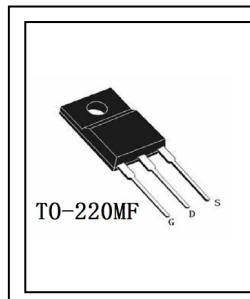
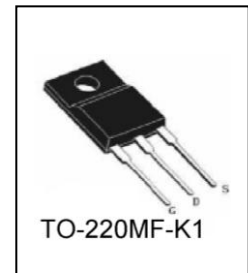
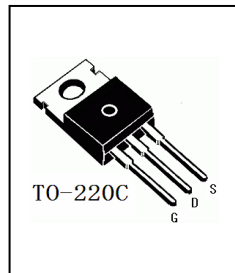
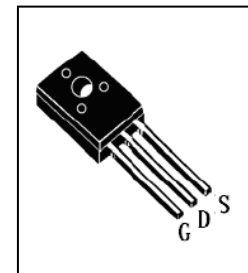
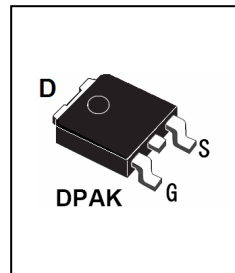
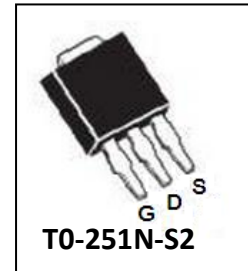
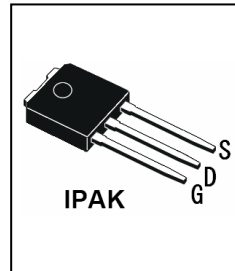
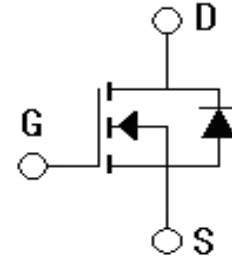
### APPLICATIONS

- High frequency switching mode power supply
- Electronic ballast
- UPS

### FEATURES

- Low gate charge
- Low  $C_{rss}$  (typical 14pF)
- 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	无卤素 Halogen Free	包 装 Packaging	器件重量 Device Weight
JCS4N70VC-O-V-N-B	JCS4N70V	IPAK	否 NO	条管 Tube	0.35 g(typ)
JCS4N70VC-R-V-N-B	JCS4N70V	IPAK	是 YES	条管 Tube	0.35 g(typ)
JCS4N70VC-R-VN2-N-B	JCS4N70V	TO-251N-S2	是 YES	条管 Tube	0.35 g(typ)
JCS4N70RC-O-R-N-B	JCS4N70R	DPAK	否 NO	条管 Tube	0.30 g(typ)
JCS4N70RC-O-R-N-A	JCS4N70R	DPAK	否 NO	编带 Reel	0.30 g(typ)
JCS4N70MFC-O-MF-N-B	JCS4N70MF	TO-126F	否 NO	条管 Tube	1.50 g(typ)
JCS4N70SC-O-S-N-B	JCS4N70S	TO-263	否 NO	条管 Tube	1.37 g(typ)
JCS4N70SC-O-S-N-A	JCS4N70S	TO-263	否 NO	编带 Reel	1.37 g(typ)
JCS4N70BC-O-B-N-B	JCS4N70B	TO-262	否 NO	条管 Tube	1.71 g(typ)
JCS4N70CC-O-C-N-B	JCS4N70C	TO-220C	否 NO	条管 Tube	2.15 g(typ)
JCS4N70FC-O-F-N-B	JCS4N70F	TO-220MF	否 NO	条管 Tube	2.20 g(typ)
JCS4N70FC-O-F1-N-B	JCS4N70F	TO-220MF-K1	否 NO	条管 Tube	1.78 g(typ)





## 绝对最大额定值 ABSOLUTE RATINGS (Tc=25℃)

项 目 Parameter	符 号 Symbol	数 值 Value				单 位 Unit
		JCS4N7 0MFC	JCS4N70V C/RC	JCS4N70S C/BC/CC	JCS4N70FC	
最高漏极—源极直流电压 Drain-Source Voltage	V <sub>DSS</sub>	700				V
连续漏极电流 Drain Current -continuous	I <sub>D</sub> T=25℃ T=100℃	4.0			4.0*	A
		2.5			2.5*	A
最大脉冲漏极电流（注1） Drain Current - pulse (note 1)	I <sub>DM</sub>	16			16*	A
最高栅源电压 Gate-Source Voltage	V <sub>GSS</sub>	±30				V
单脉冲雪崩能量（注2） Single Pulsed Avalanche Energy(note 2)	E <sub>AS</sub>	265				mJ
雪崩电流（注1） Avalanche Current (note 1)	I <sub>AR</sub>	4.0				A
重复雪崩能量（注1） Repetitive Avalanche Current (note 1)	E <sub>AR</sub>	11.0				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	5.0				V/n s
耗散功率 Power Dissipation	P <sub>D</sub> T <sub>C</sub> =25℃ -Derate above25℃	26	51	100	33	W
		0.21	0.39	0.80	0.26	W/ ℃
最高结温及存储温度 Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55~+150				℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T <sub>L</sub>	300				℃

\*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	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	700	-	-	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 $25^\circ C$	-	0.66	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=700V, V_{GS}=0V,$ $T_C=25^\circ C$	-	-	10	$\mu A$
		$V_{DS}=560V, T_C=125^\circ C$	-	-	100	$\mu A$
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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D=2A$	-	2.6	2.8	$\Omega$
正向跨导 Forward Transconductance	$g_{fs}$	$V_{DS} = 40V, I_D=2A$ (note 4)	-	3.6	-	S
<b>动态特性 Dynamic Characteristics</b>						
输入电容 Input capacitance	$C_{iss}$	$V_{DS}=25V,$ $V_{GS}=0V,$ $f=1.0MHz$	-	790	950	pF
输出电容 Output capacitance	$C_{oss}$		-	67	92	pF
反向传输电容 Reverse transfer capacitance	$C_{rss}$		-	14	17	pF





## 电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=350V, I_D=4A, R_G=25\Omega$ (note 4, 5)	-	30	50	ns
上升时间 Turn-On rise time	$t_r$		-	65	110	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	50	130	ns
下降时间 Turn-Off Fall time	$t_f$		-	45	90	ns
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{DS}=560V,$ $I_D=4A$ $V_{GS}=10V$ (note 4, 5)	-	16	20	nC
栅-源电荷 Gate-Source charge	$Q_{gs}$		-	2.0	-	nC
栅-漏电荷 Gate-Drain charge	$Q_{gd}$		-	7.0	-	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		$I_S$	-	-	4	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current		$I_{SM}$	-	-	16	A
正向压降 Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V,$ $I_S=4.0A$	-	-	1.4	V
反向恢复时间 Reverse recovery time	$t_{rr}$	$V_{GS}=0V, I_S=4.0A$ $di_F/dt=100A/\mu s$ (note 4)	-	340	-	ns
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		-	2.65	-	$\mu C$

## 热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max				单 位 Unit
		JCS4N7 0MFC	JCS4N7 0VC/RC	JCS4N70 SC/BC/CC	JCS4N70 FC	
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	4.8	2.50	1.25	3.79	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	110	83	62.5	62.5	$^{\circ}C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2:  $L=31mH, I_{AS}=4.0A, V_{DD}=50V, R_G=25\Omega$ , 起始结温  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 4.0A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , 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:

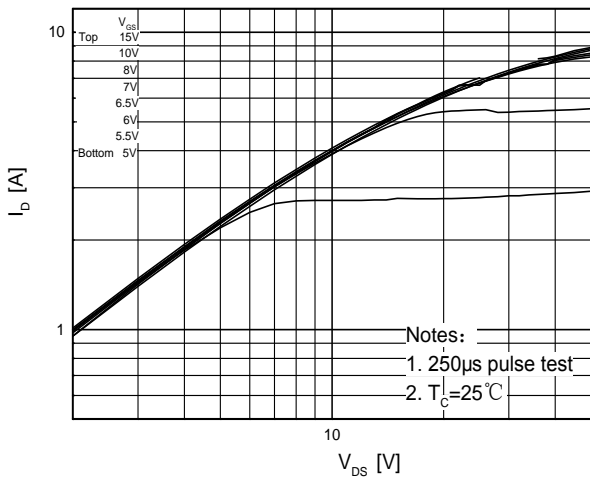
- 1: Pulse width limited by maximum junction temperature
- 2:  $L=31mH, I_{AS}=4.0A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}C$
- 3:  $I_{SD} \leq 4.0A, di/dt \leq 200A/\mu s, V_{DD} \leq BV_{DSS}$ , Starting  $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
- 5: Essentially independent of operating temperature



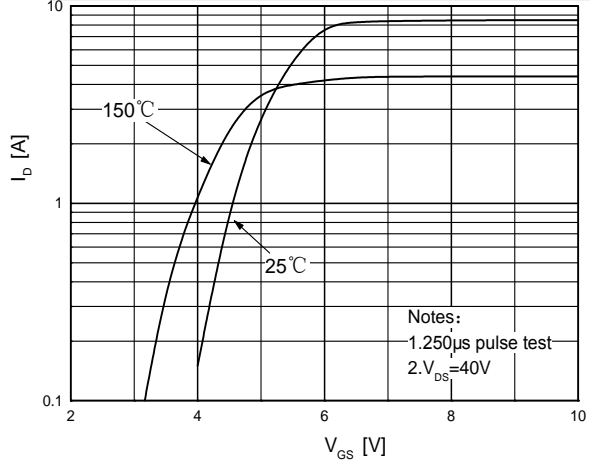


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

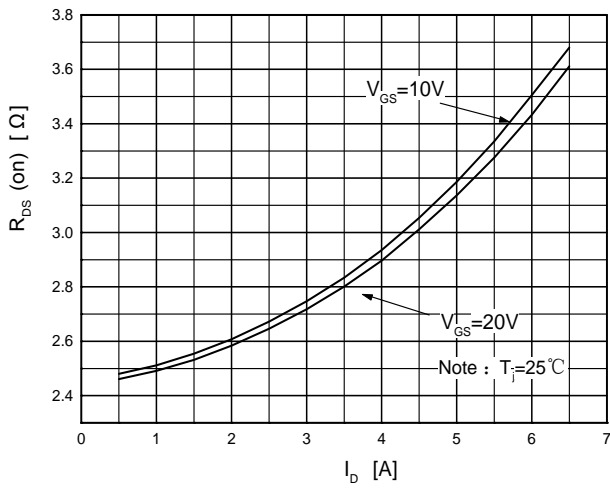
On-Region Characteristics



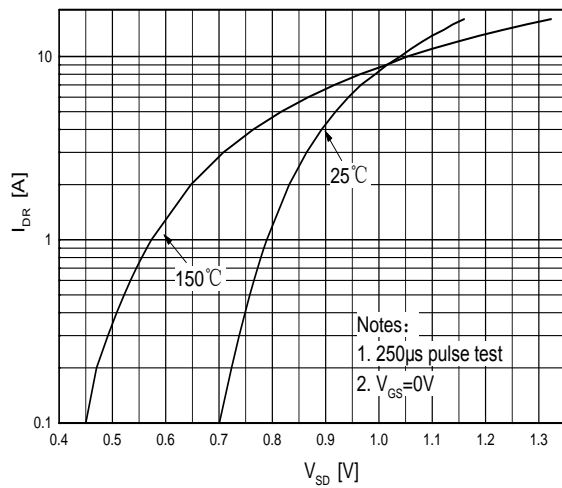
Transfer Characteristics



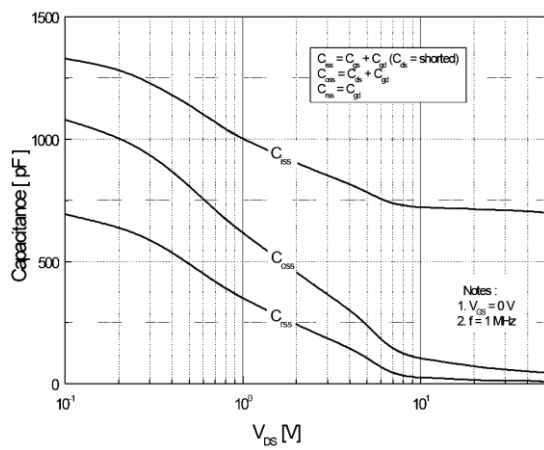
On-Resistance Variation vs. Drain Current and Gate Voltage



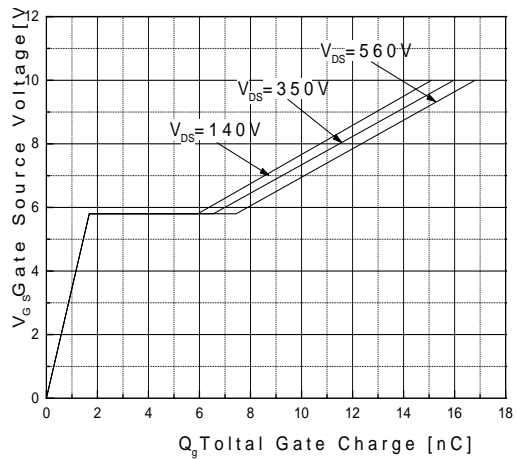
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics



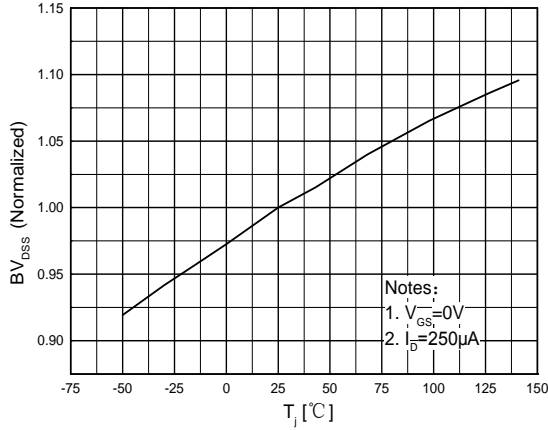
Gate Charge Characteristics



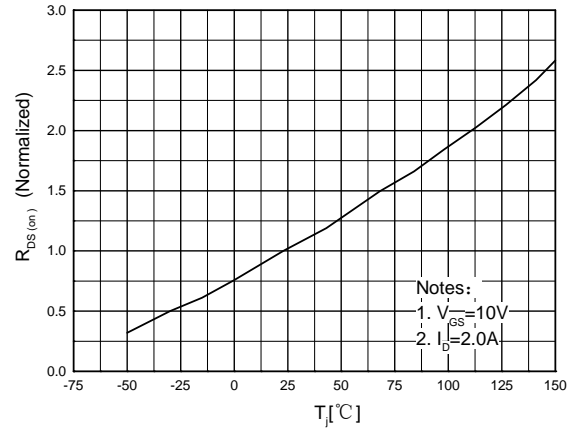


### 特征曲线 ELECTRICAL CHARACTERISTICS (curves)

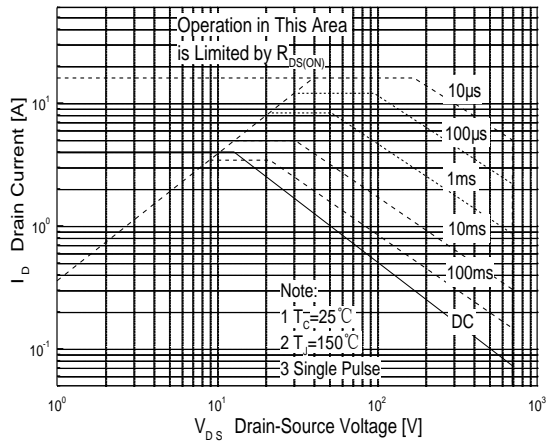
#### Breakdown Voltage Variation vs. Temperature



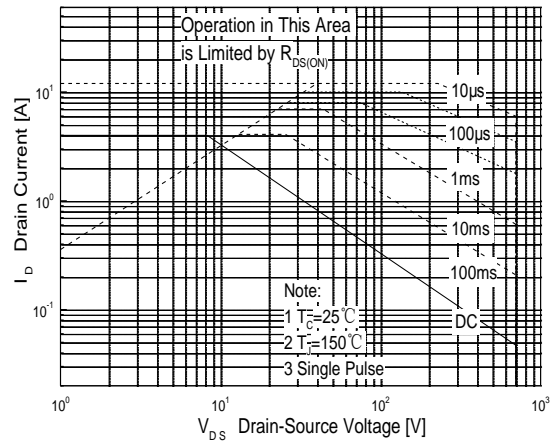
#### On-Resistance Variation vs. Temperature



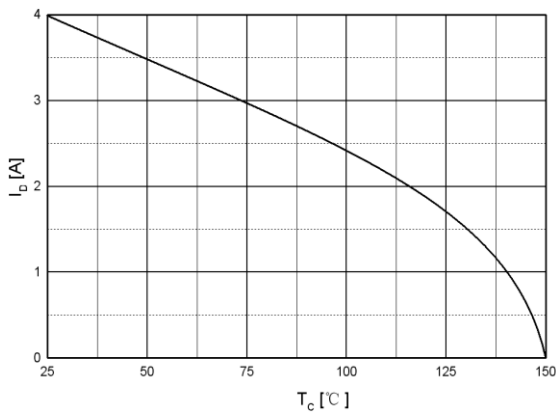
#### Maximum Safe Operating Area For JCS4N70VC/RC/SC/BC/CC



#### Maximum Safe Operating Area For JCS4N70FC

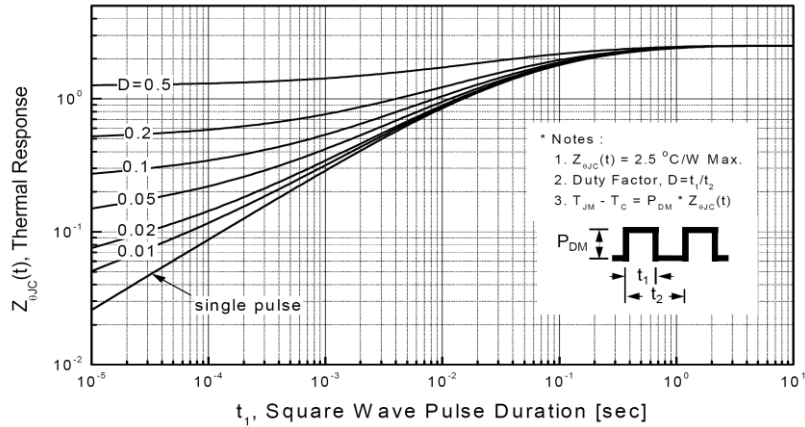


#### Maximum Drain Current vs. Case Temperature

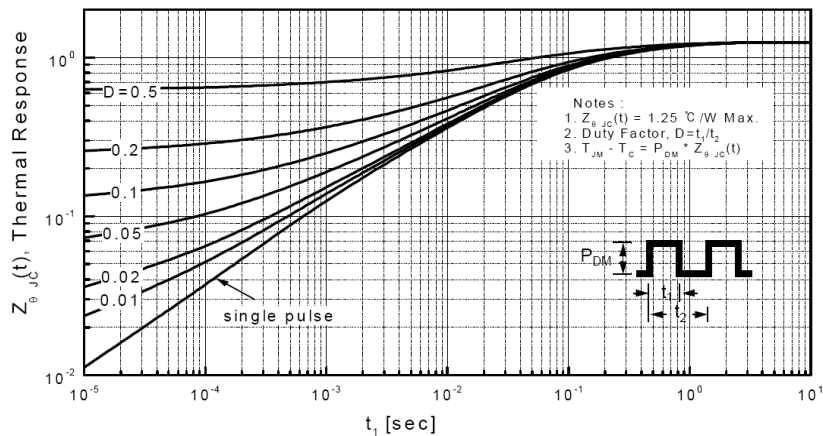


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

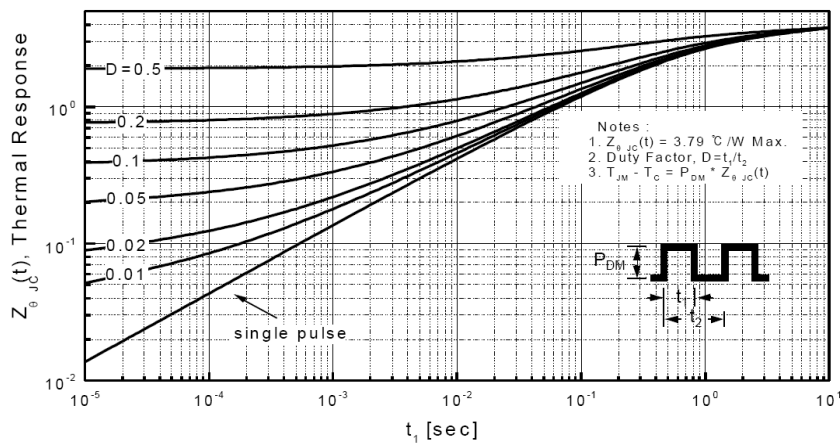
**Transient Thermal Response Curve  
For JCS4N70VC/RC**



**Transient Thermal Response Curve  
For JCS4N70SC/BC/CC**



**Transient Thermal Response Curve  
For JCS4N70FC**

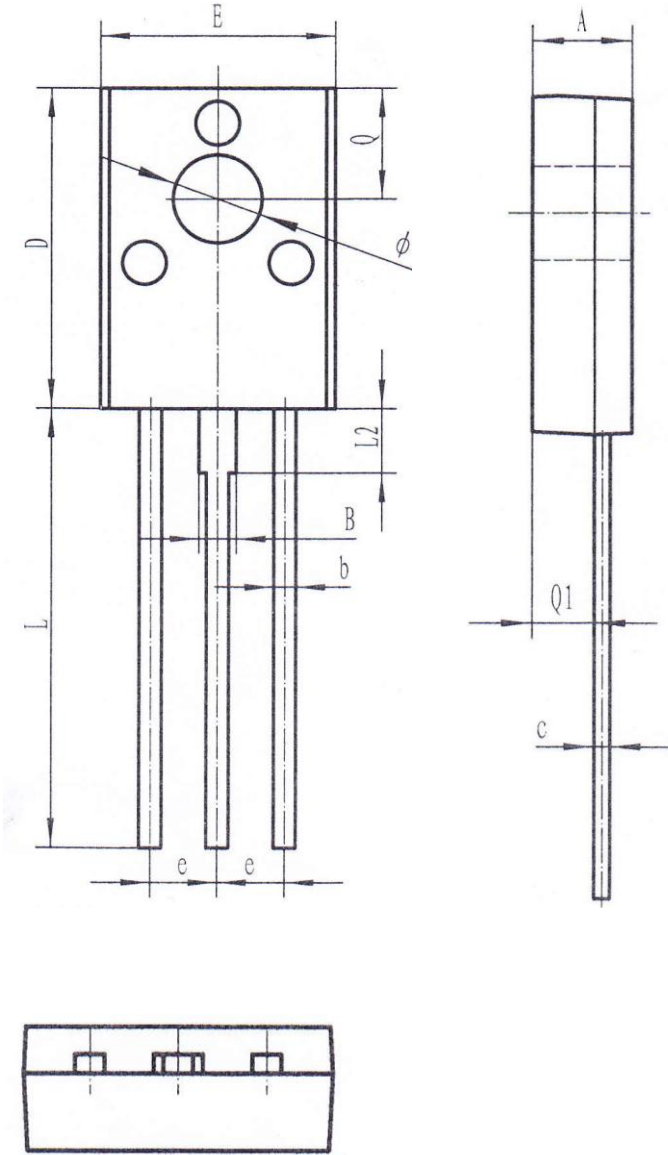






外形尺寸 PACKAGE MECHANICAL DATA  
TO-126F

单位 Unit: mm



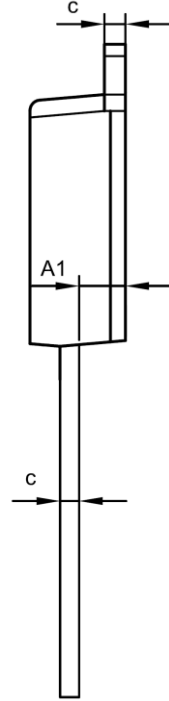
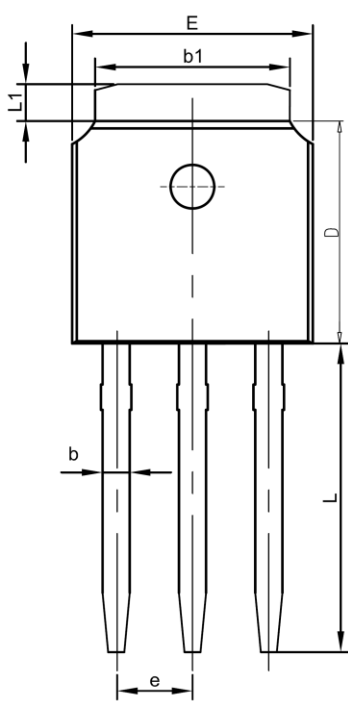
符号 symbol	MIN	MAX
A	3.10	3.30
B	1.22	1.47
b	0.60	0.90
c	0.45	0.70
D	10.50	11.20
E	7.50	8.50
e	2.29 TYP	
L	15.00	16.00
L2	2.10	2.30
Q	3.60	4.00
Q1	1.80	2.20
P	2.95	3.15



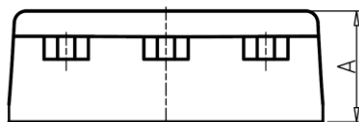


外形尺寸 PACKAGE MECHANICAL DATA  
IPAK

单位 Unit: mm



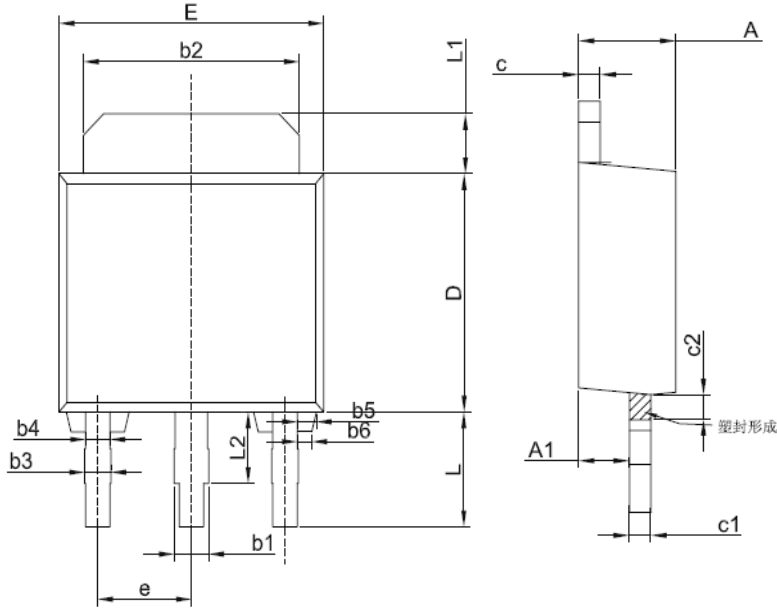
SYMBOL	MM	
	MIN	MAX
A	2.1	2.5
A1	0.87	1.27
b	0.63	0.93
b1	5.13	5.53
c	0.40	0.60
D	5.80	6.40
E	6.30	6.90
L	9.10	9.70
e	2.286BSC	
L1	0.82	1.22



外形尺寸 PACKAGE MECHANICAL DATA

TO-251N-S2

单位 Unit: mm

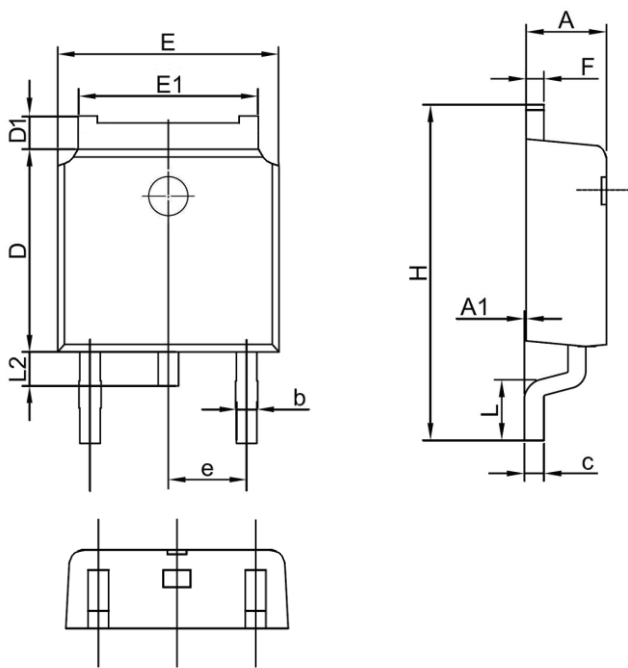


SYMBOL	MM	
	MIN	MAX
A	2.050	2.550
A1	1.050	1.350
b1	0.680	0.920
b2	5.150	5.450
b3	0.530	0.770
b4	0.480	0.720
b5	0.280	0.520
b6	0.180	0.420
c	0.400	0.600
c1	0.400	0.600
c2	0.180	0.420
D	5.350	5.850
E	6.350	6.850
e	2.3 (TYP)	
L	2.550	3.050
L1	1.4	1.8
L2	1.25	1.55



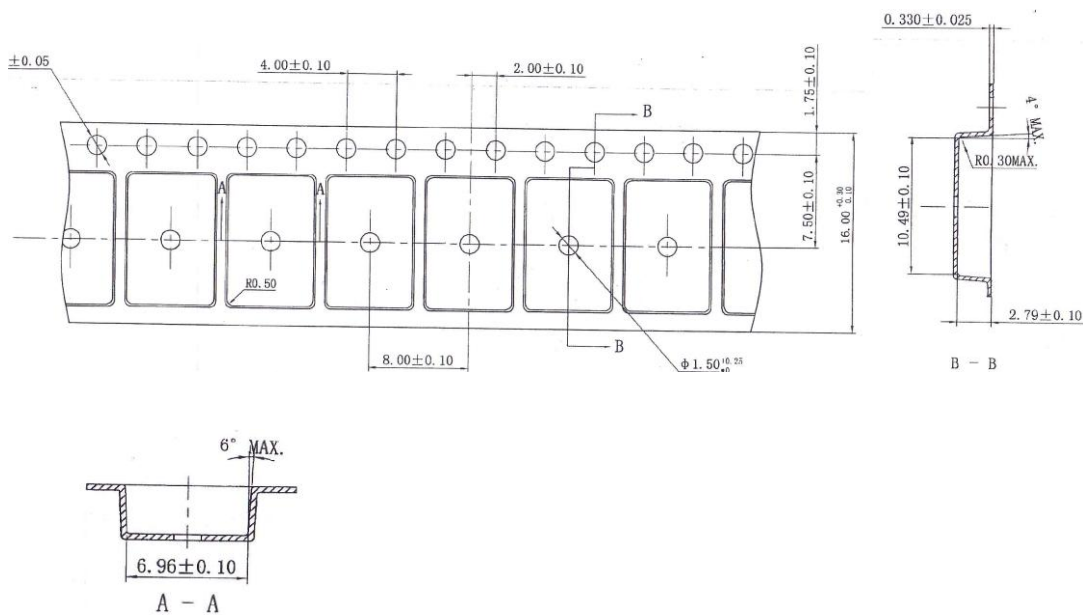
DPAK

单位 Unit: mm



符号 symbol	MIN	MAX
A	2.2	2.4
A1	0.0	0.2
b	0.7	0.9
c	0.45	0.55
D	6.0	6.3
D1	0.8	1.2
E	6.5	6.8
E1	5.2	5.5
e	2.28TYP	
F	0.45	0.55
H	9.65	10.45
L	1.4	1.7
L2	0.6	1.0

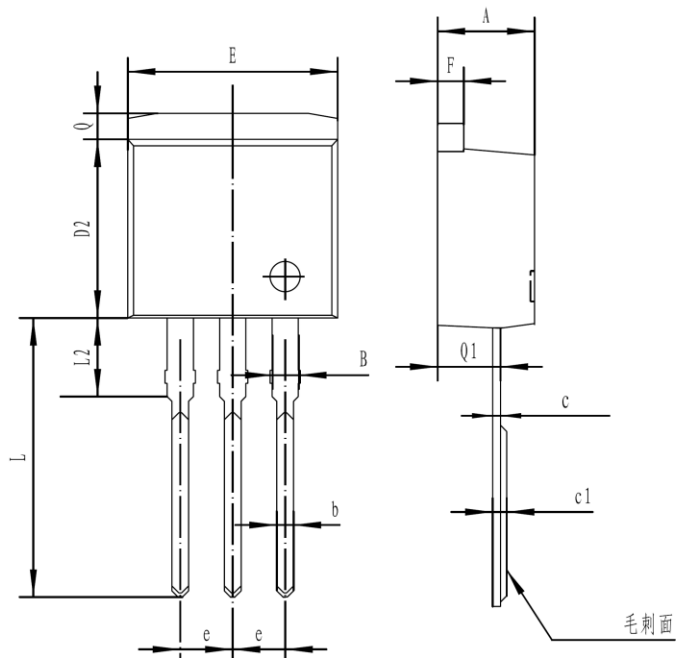
编带 REEL





TO-262

单位 Unit: mm



符号 symbol	MIN	MAX
A	4.40	4.90
B	1.10	1.40
b	0.70	0.95
c	0.30	0.60
c1	0.33	0.63
D2	8.20	9.20
E	9.60	10.50
e	2.39	2.69
F	1.20	1.35
L	13.11	14.61
L2	3.55	4.05
Q	1.10	1.40
Q1	2.65	2.85

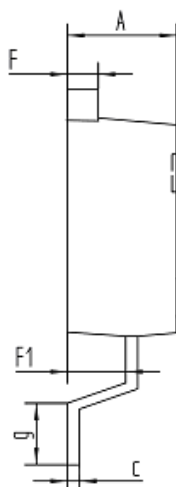
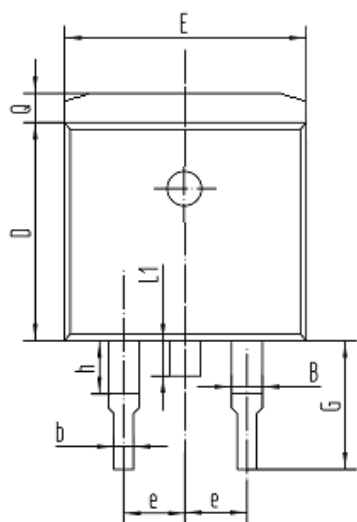




外形尺寸 PACKAGE MECHANICAL DATA

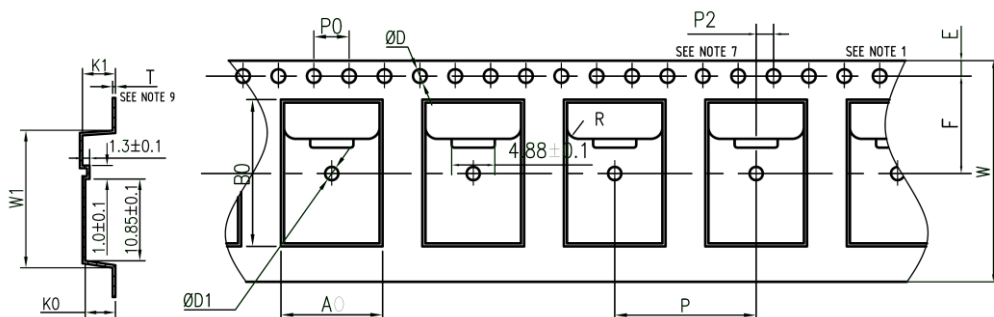
TO-263

单位 Unit: mm



符合 symbol	MIN	MAX
A	4.3	4.8
B	1.2	1.4
D	8.5	8.8
E	9.5	10.5
F	1.2	1.4
F1	2.5	2.9
G	4.7	5.5
L1	1.4	1.7
Q	1.2	1.5
b	0.75	0.95
c	0.35	0.5
e	2.49	2.59
g	1.9	2.7
h	2.3	3.3

编带 REEL



NOTES

- 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE 0.2mm;  
任意10个传轴孔间距累积误差0.2mm;
- MATERIAL: BLACK CONDUCTIVE POLYSTYRENE;  
材料: 黑色防静电聚苯乙烯;
- DEMENSIONS ARE IN mm (UNLESS OTHERWISE SPECIFIED);  
除非特别标注, 尺寸单位为毫米;
- K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE ON THE CARRIER;  
K0是从凹槽底部上表面到载带顶面的测量尺寸;
- A0 AND B0 MEASURED ON A PLANE 0.30mm ABOVE THE BOTTOM OF THE POCKET;  
从凹槽底部上方测量A0和B0的平面度是0.30mm;
- SURFACE RESISTIVITY IS BETWEEN 1×10E6 TO 1×10E10 OHMS/SQUARE;  
表面电阻1X10e6~1X10e10Ω/□;
- Allowable Camber to be 1 mm/100 mm  
载带100mm以内, 弯曲度不可超过1mm.

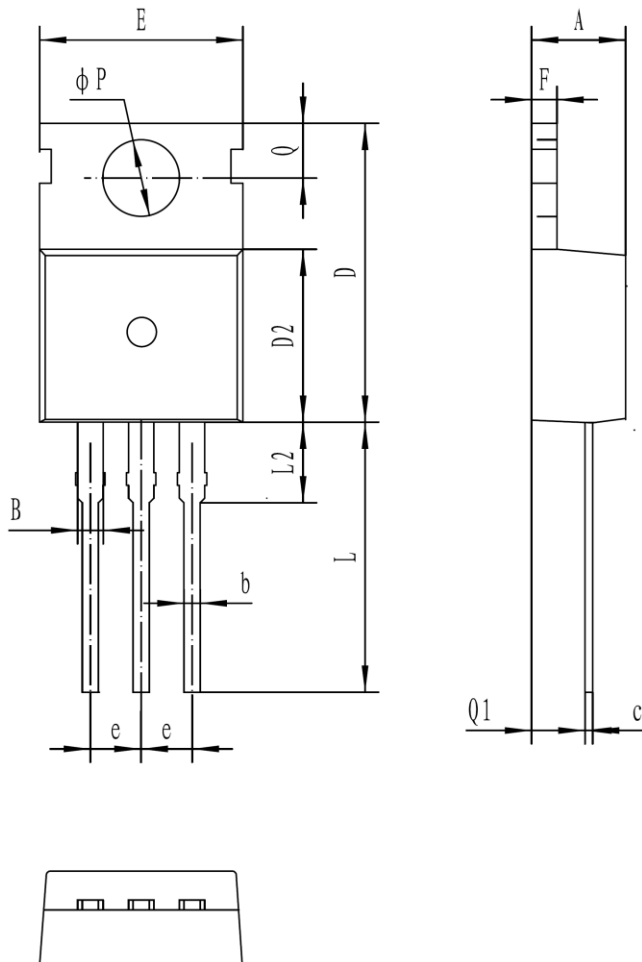
外观	尺寸	外观	尺寸
P0	4.0±0.1	W	24.0±0.3
P2	2.0±0.1	A0	10.8±0.2
P	16.0±0.1	E	1.75±0.1
T	0.35±0.05	F	11.5±0.1
K0	4.85±0.1	D	1.55±0.05
B0	16.3±0.1	D1	1.5±0.1
		W1	规格1 16.9±0.1
			规格2 17.2±0.1





TO-220C

单位 Unit: mm



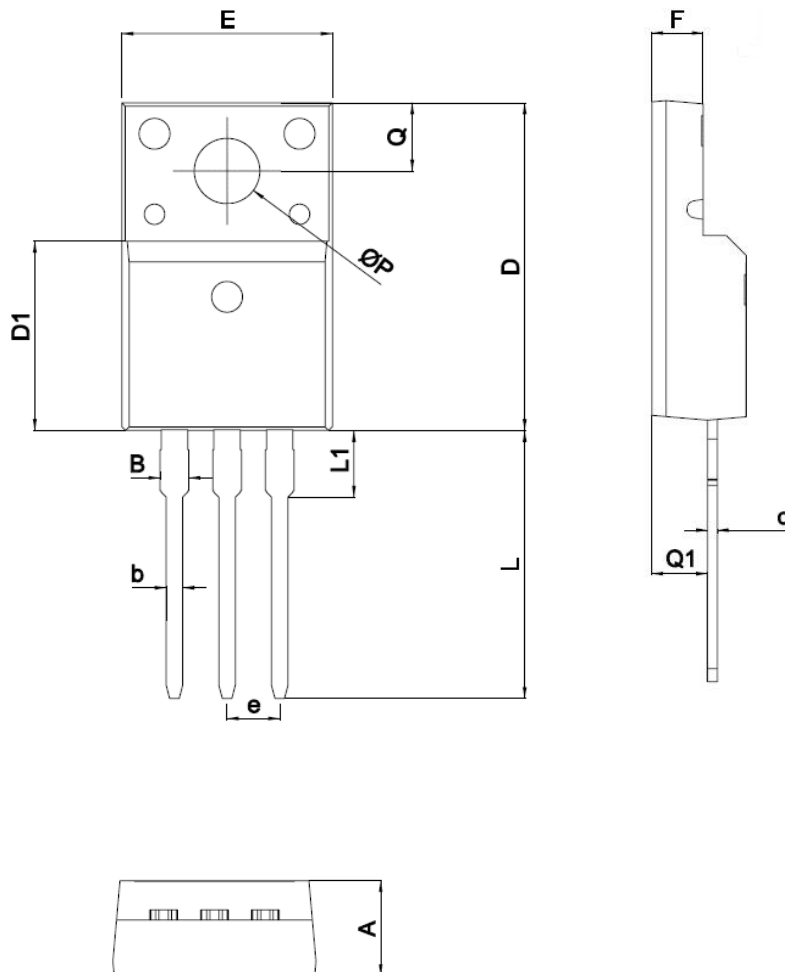
符号 symbol	MIN	MAX
A	4.30	4.70
B	1.10	1.40
b	0.70	0.95
c	0.40	0.65
D	15.20	16.20
D2	9.00	9.40
E	9.70	10.10
e	2.39	2.69
F	1.25	1.40
L	12.60	13.60
L2	2.80	3.20
Q	2.60	3.00
Q1	2.20	2.60
P	3.50	3.80





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
ΦP	3.08	3.28

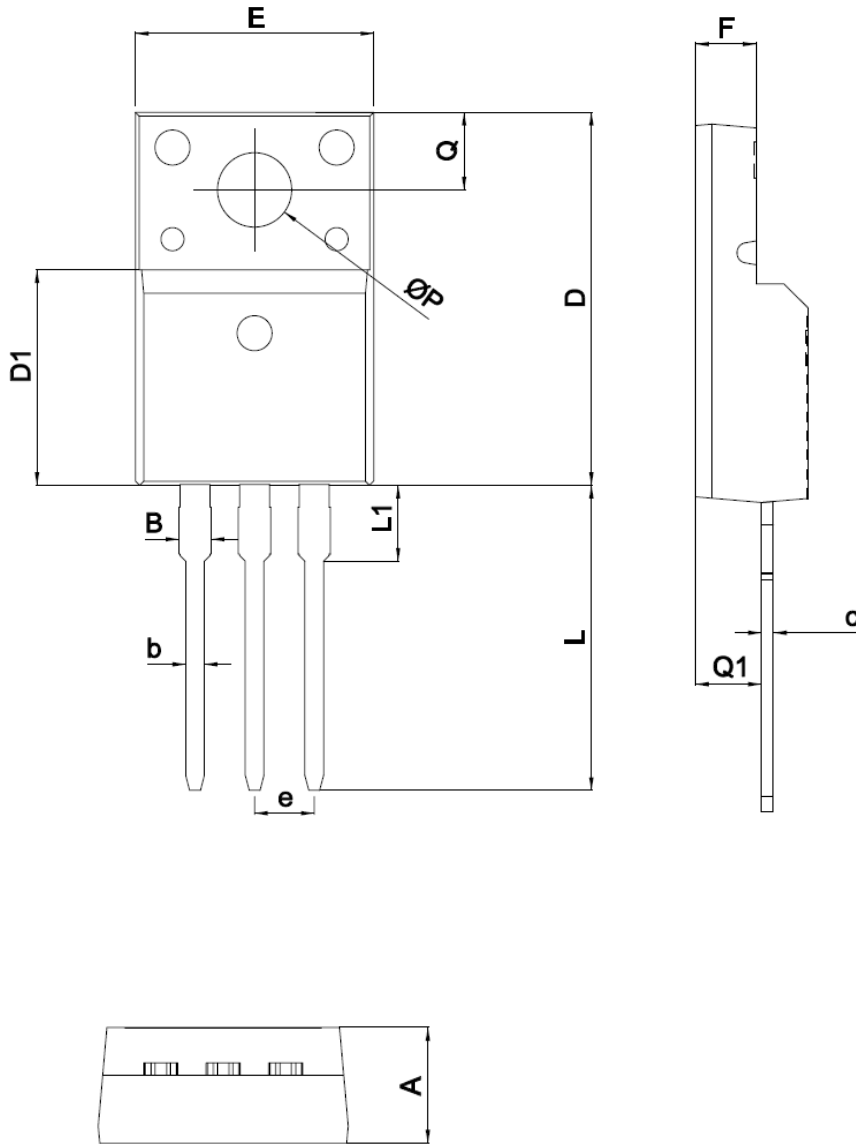






TO-220MF-K1

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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