

**N-沟道超级结功率 MOS 管**

**SIF70R420**

**N-CHANNEL SUPER JUNCTION POWER MOSFET**

●特点：新高压器件技术 低导通电阻和低传导损耗 封装小 超低栅极电荷导致较低的驱动要求  
100%雪崩测试 符合RoHS规范

●FEATURES: ■NEW TECHNOLOGY FOR HIGH VOLTAGE DEVICE ■LOW ON-RESISTANCE AND LOW CONDUCTION LOSSES ■SMALL PACKAGE ■ULTRA LOW GATE CHARGE CAUSE LOWER DRIVING REQUIREMENTS ■100% AVALANCHE TESTED ■ROHS COMPLIANT

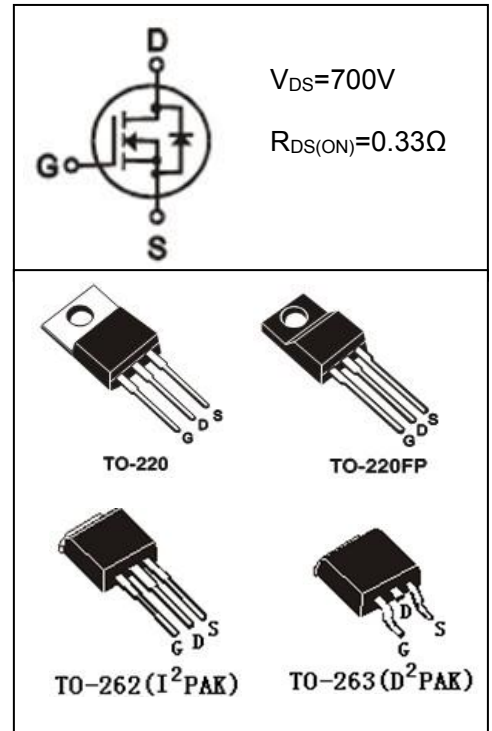
●应用：功率因数校正（PFC） 开关电源（SMPS） UPS 电源

●APPLICATION: ■POWER FACTOR CORRECTION (PFC) ■SWITCHED MODE POWER SUPPLIES(SMPS) ■UNINTERRUPTIBLE POWER SUPPLY (UPS)

●最大额定值（TC=25°C）

●Absolute Maximum Ratings（Tc=25°C） TO-220/220FP/262/263

参数 PARAMETER	符号 SYMBOL	额定值 VALUE	单位 UNIT
漏-源电压 Drain-source Voltage	V <sub>DS</sub>	700	V
栅-源电压 gate-source Voltage	V <sub>GS</sub>	±25	V
漏极电流 Continuous Drain Current TC=25°C	I <sub>D</sub>	8	A
漏极电流 Continuous Drain Current TC=100°C	I <sub>D</sub>	5	A
最大脉冲电流 Drain Current — Pulsed ①	I <sub>DM</sub>	22	A
耗散功率 Power Dissipation	P <sub>D</sub>	Others: 50 220FP: 23	W
最高结温 Junction Temperature	T <sub>J</sub>	150	°C
存储温度 Storage Temperature	T <sub>STG</sub>	-55-150	°C
漏源电压斜率 Drain Source voltage slope	dV/dt	1	V/ns
单脉冲雪崩能量 Single Pulse Avalanche Energy ②	E <sub>AS</sub>	100	mJ



●热特性

●Thermal Characteristic

参数 PARAMETER	符号 SYMBOL	最大值 MAX		单位 UNIT
		TO-220/TO-262,263	TO-220FP	
热阻结-壳 Thermal Resistance Junction-case	R <sub>thJC</sub>	2.5	5.43	°C/W
热阻结-环境 Thermal Resistance Junction-ambient	R <sub>thJA</sub>	62	62.5	°C/W

●订单信息/ORDERING INFORMATION:

包装形式/PACKING	订货编码/ORDERING CODE	
	普通塑封料/ Normal Package Material	无卤塑封料/Halogen Free
TO-220 条管装/TUBE PACKING	SIF70R420 TO-220-TU	SIF70R420 TO-220-TU-HF
TO-220FP 条管装/TUBE PACKING	SIF70R420 TO-220FP-TU	SIF70R420 TO-220FP-TU-HF
TO-262 或 263 条管装/TUBE PACKING	SIF70R420 TO-262-TU 或 SIF70R420 TO-263-TU	SIF70R420 TO-262-TU-HF 或 SIF70R420 TO-263-TU-HF
TO-263 编带装/TAPE & REEL PACKING	SIF70R420 TO-263-TR	SIF70R420 TO-263-TR-HF

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电特性 (Tc=25°C)

● Electronic Characteristics (Tc=25°C)

参数 PARAMETER	符号 SYMBOL	测试条件 TEST CONDITION	最小值 MIN	典型值 TYP	最大值 MAX	单位 UNIT
漏-源击穿电压 Drain-source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	700			V
漏-源漏电流 Drain-source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =700V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			1	μA
栅极漏电流 Gate-body Leakage Current (V <sub>DS</sub> = 0)	I <sub>GSS</sub>	V <sub>GS</sub> =±25V			±3	uA
栅极开启电压 Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
漏-源导通电阻 Static Drain-source On Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =4A		0.33	0.42	Ω
跨导 Forward Transconductance	gfs	V <sub>DS</sub> =10V, I <sub>D</sub> =4A		8		S
输入电容 Input Capacitance	Ciss	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 50V F = 1.0MHZ		1070		pF
输出电容 Output Capacitance	Coss			385		
反向传输电容 Reverse transfer Capacitance	Crss			385		
栅极电荷 Total Gate Charge	Qg	I <sub>D</sub> =8A, V <sub>DS</sub> = 10V V <sub>GS</sub> = 10V		5.5		nC
栅源电荷 Gate-to-Source Charge	Qgs			3.55		nC
栅漏电荷 Gate-to-Drain Charge	Qgd			1.1		nC
栅电阻 Intrinsic Gate Resistance	RG	f=1MHz open drain		14.5		Ω
开启延迟 Turn -on Delay Time	Td(on)	VDD=400V, ID =1.7A RG=5.3Ω VGS=13V		19.2		ns
上升时间 Turn -on Rise Time	tr			7.8		ns
关断延迟 Turn -Off Delay Time	Td(off)			84		ns
下降时间 Turn -Off Fall Time	tf			24		ns
二极管正向电流 Continuous Diode Forward Current	I <sub>SD</sub>	TC=25°C			6	A
二极管正向压降 Diode Forward Voltage	V <sub>SD</sub>	T <sub>J</sub> =25°C, I <sub>SD</sub> =8.0A V <sub>GS</sub> =0V		0.9	1.3	V
反向恢复时间 Reverse Recovery Time	trr	T <sub>J</sub> =25°C, V <sub>R</sub> =400V I <sub>F</sub> =1.7A di <sub>F</sub> /dt=50A/μs		240		ns
反向恢复电荷 Reverse Recovery Charge	Q <sub>rr</sub>			0.84		uC
反向恢复电流峰值 Peak Reverse Recovery Current	I <sub>rrm</sub>			9.6		A

注释(Notes):

① 脉冲宽度: 以最高节温为限制

Repetitive rating: Pulse width limited by maximum junction temperature

② EAS测试条件: VDD=50V RG=25Ω L=5mH, T<sub>J</sub>=25°C

EAS Test condition: VDD=50V RG=25Ω L=5mH, T<sub>J</sub>=25°C

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● 特性曲线 Characteristic curve

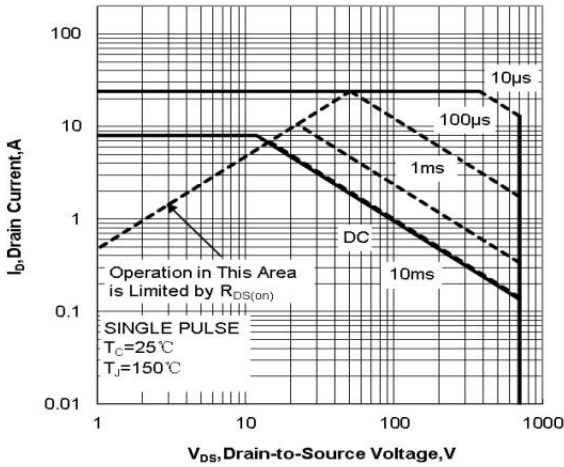


图 1 最大安全工作区曲线 (TO-220/262/263)  
Fig1 Maximum Safe Operating Area (TO-220/262/263)

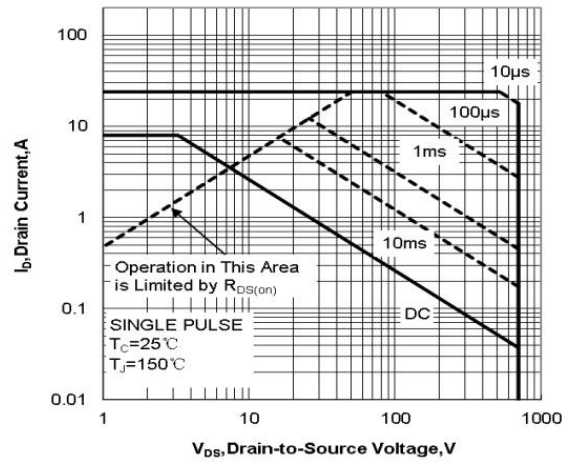


图 2 最大安全工作区曲线 (TO-220FP)  
Fig2 Maximum Safe Operating Area

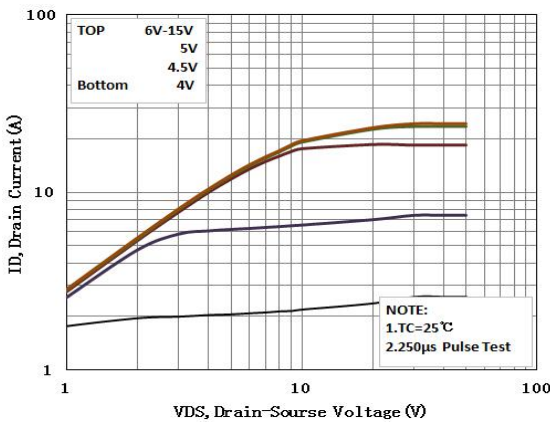


图 3 输出特性曲线, Tc=25°C  
Fig3 Typical Output Characteristics

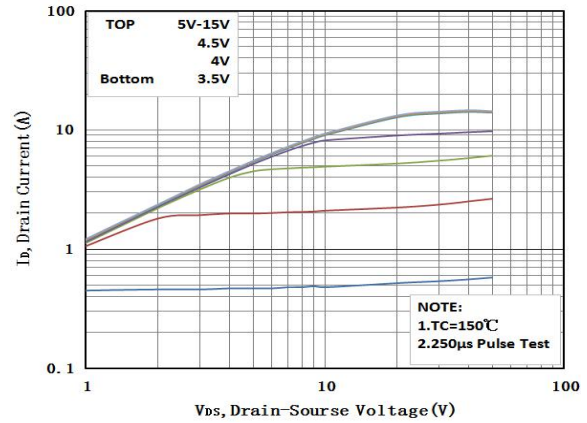


图 4 输出特性曲线, Tc=150°C  
Fig4 Typical Output Characteristics

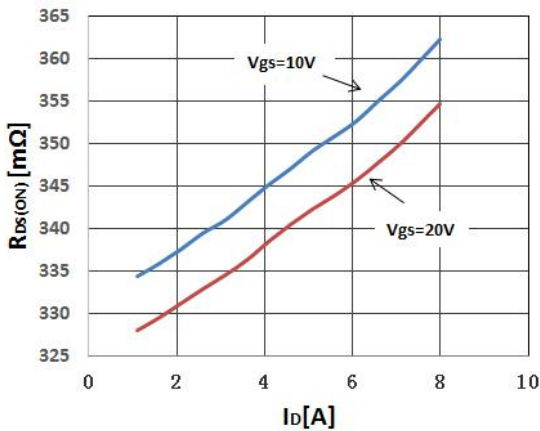


图 5 静态导通电阻与电流曲线  
Fig5 Static drain-source On-Resistance

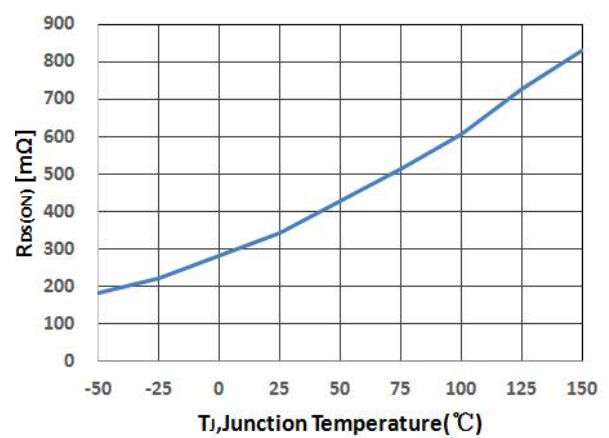


图 6 导通电阻与结温曲线  
Fig6 RDS(on) VS Junction Temperature

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● 特性曲线 Characteristic curve

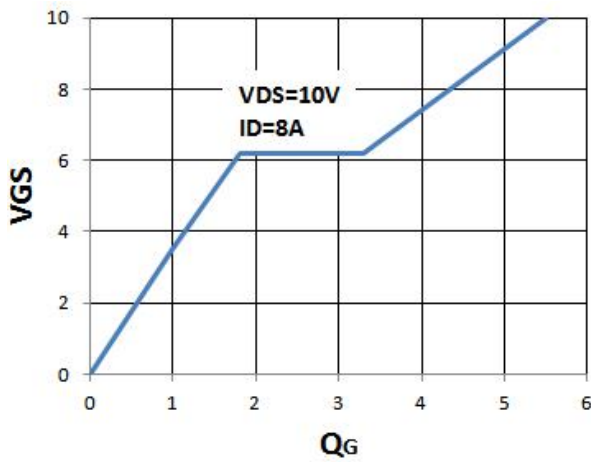


图 7 栅电荷与 VGS 关系曲线  
Fig7 Gate Charge waveforms

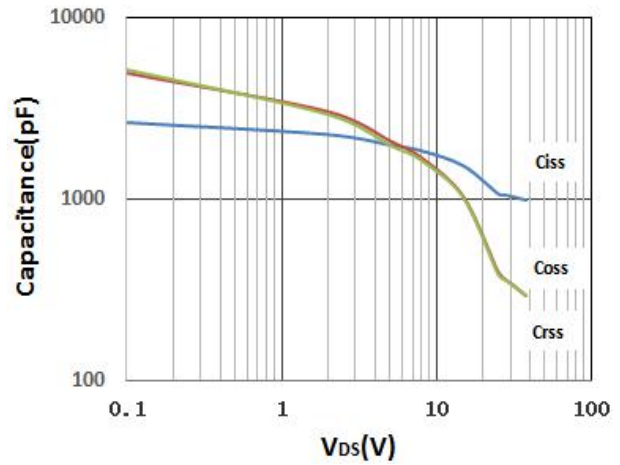


图 8 电容与漏源电压关系曲线  
Fig8 Capacitance

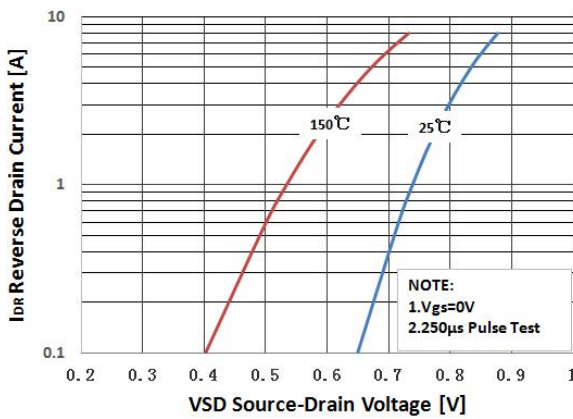


图 9 二极管正向电压曲  
Fig9 Typical Source-Drain Diode Forward Voltage

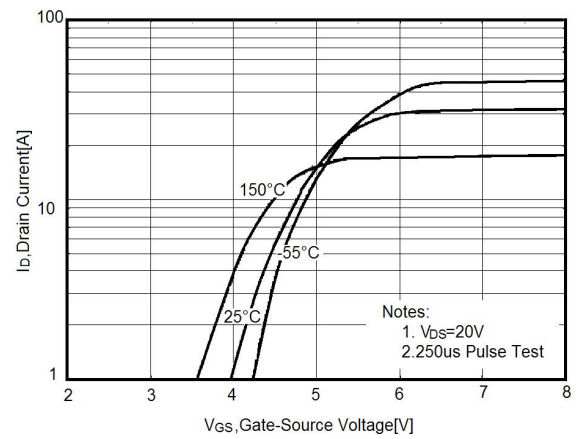
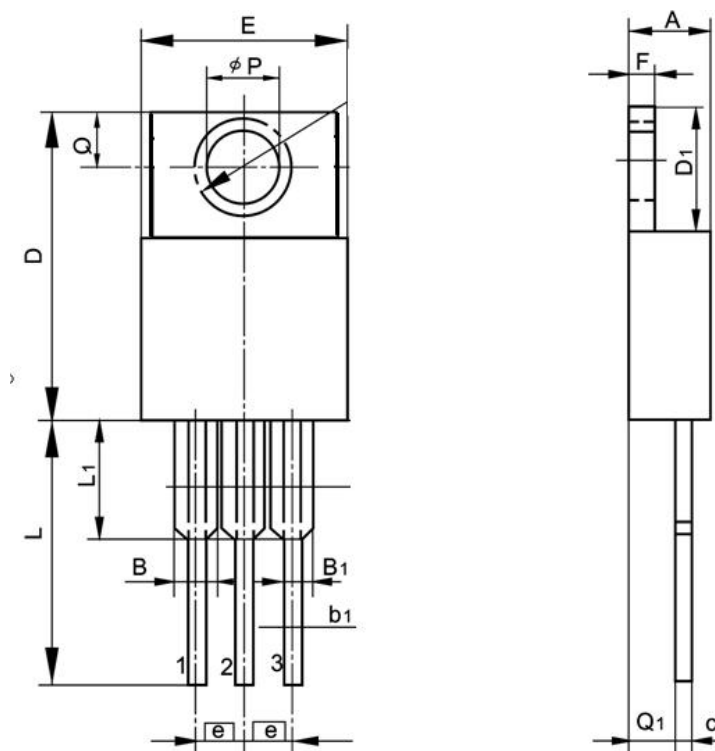


图 10 传输特性曲线  
Fig10 Transfer Characteristics

## TO-220 封装机械尺寸 TO-220 MECHANICAL DATA

单位：毫米/UNIT: mm

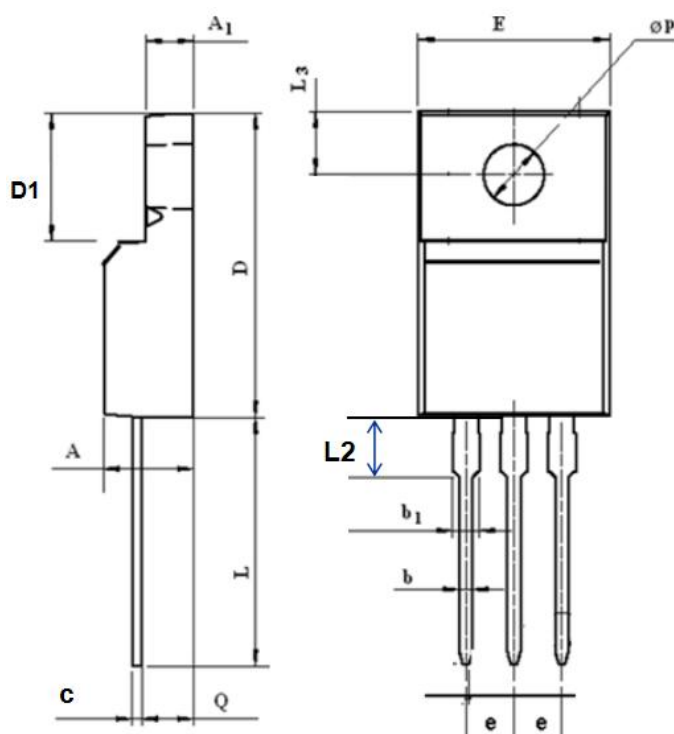
符号 SYMBOL	最小值 min	典型值 nom	最大值 max	符号 SYMBOL	最小值 min	典型值 nom	最大值 max
A	4.00		4.80	E	9.90		10.70
B	1.20		1.50	e		2.54	
B1	1.00		1.40	F	1.10		1.45
b1	0.65		1.00	L	12.50		14.50
c	0.35		0.75	L1	3.00	3.50	4.00
D	15.00		16.50	Q	2.50		3.00
D1	5.90		6.90	Q1	2.00		3.00
				$\phi P$	3.50		3.90



## TO-220FP 封装机械尺寸 TO-220FP MECHANICAL DATA

单位:毫米/UNIT: mm

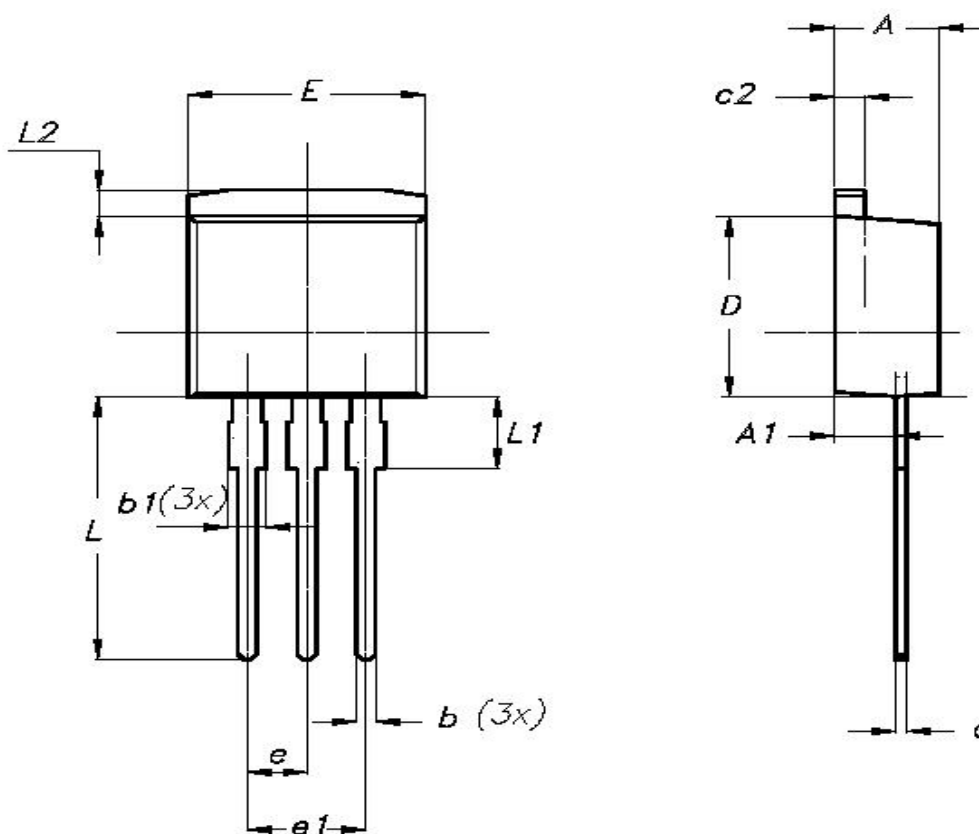
符号 SYMBOL	最小值 min	典型值 nom	最大值 max	符号 SYMBOL	最小值 min	典型值 nom	最大值 max
A	4.40		4.95	E	9.60		10.30
A <sub>1</sub>	2.30		2.90	e		2.54	
b	0.70		0.90	L	12.40		14.00
b <sub>1</sub>	1.18		1.45	L <sub>2</sub>	2.30		2.60
c	0.40		0.70	L <sub>3</sub>	3.00		4.00
D	14.50		17.00	∅p	3.00		3.50
D1	6.10		9.00	Q	2.30		2.80



## TO-262 封装机械尺寸 TO-262 MECHANICAL DATA

单位：毫米/UNIT: mm

符号 SYMBOL	最小值 min	典型值 nom	最大值 max	符号 SYMBOL	最小值 min	典型值 nom	最大值 max
A	3.80		4.80	e		2.54	
A1	2.00		2.80	e1			5.30
b	0.60		1.00	E	9.90		10.70
b1	1.20		1.40	L	12.50		14.50
c	0.40		0.70	L1	0.80	1.00	1.20
c2	1.10		1.40	L2			1.50
D			9.60				

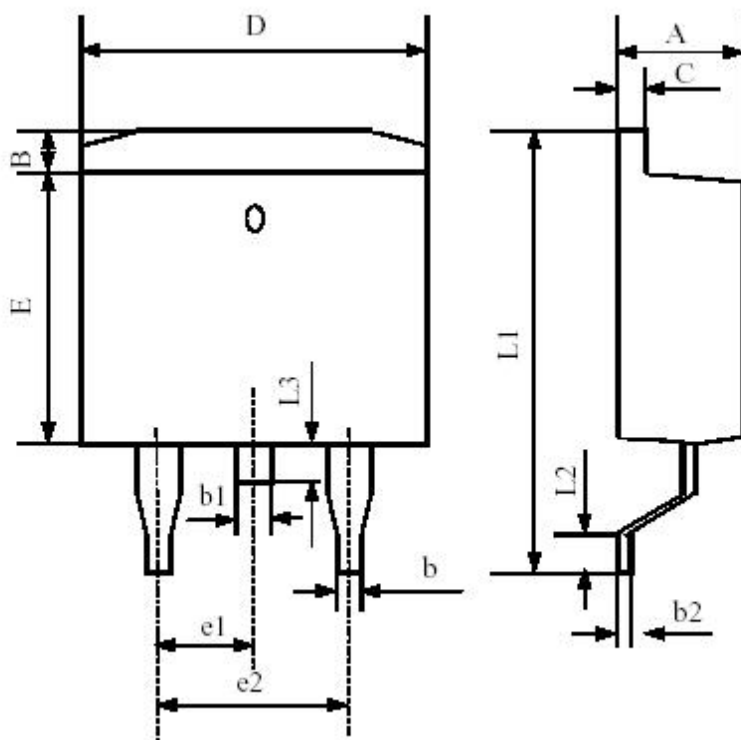


## TO-263 封装机械尺寸

### TO-263(D2PAK) MECHANICAL DATA

单位：毫米/UNIT: mm

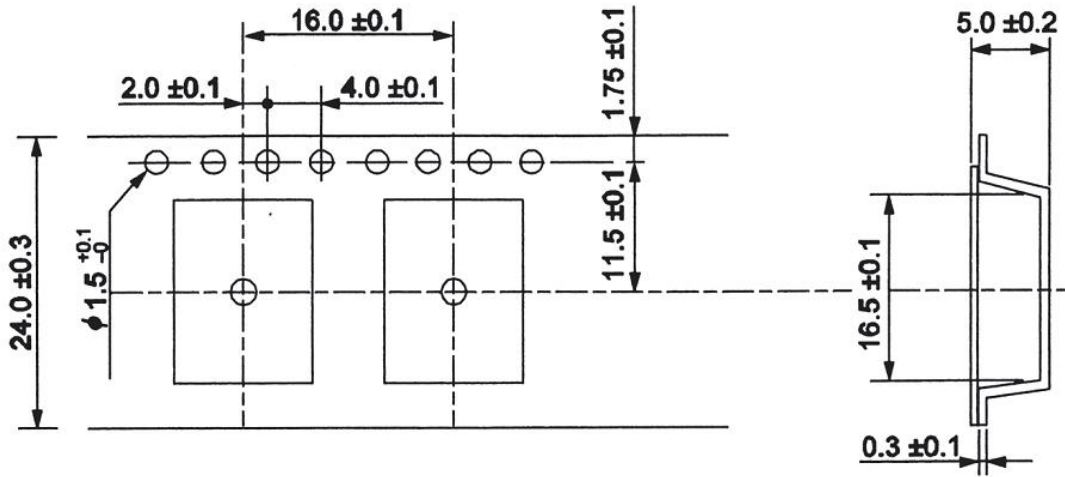
符号 SYMBOL	最小值 min	典型值 nom	最大值 max	符号 SYMBOL	最小值 min	典型值 nom	最大值 max
A	4.42		4.72	E	8.99		9.29
B	1.22		1.32	e1	2.44		2.64
b	0.76		0.86	e2	4.98		5.18
b1	1.22		1.32	L1	15.19		15.79
b2	0.33		0.43	L2	2.29		2.79
C	1.22		1.32	L3	1.30		1.75
D	9.95		10.25				



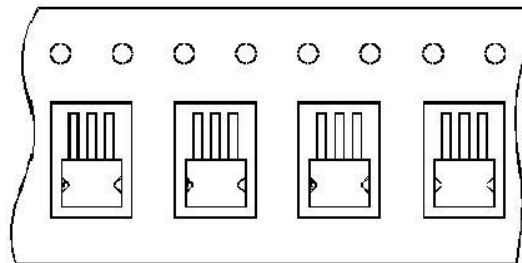


### TO-263 编带规格尺寸 TO-263 TAPE AND REEL DATA

单位:毫米/UNIT: mm



使用供带方向/USER DIRECTION OF FEED



编带器件定位示意图/UNIT ORIENTATION