

**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-251T/251S/252/252T

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>	35	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

V<sub>DS</sub>=700V  
R<sub>DS(ON)</sub>=0.33Ω

TO-251T(IPAK) TO-251S  
TO-252(DPAK) TO-252T

●热特性

●Thermal Characteristic

参数 PARAMETER	符号 SYMBOL	最大值 MAX	单位 UNIT
热阻结-壳 Thermal Resistance Junction-case	R <sub>thJC</sub>	3.6	°C/W
热阻结-环境 Thermal Resistance Junction-ambient	R <sub>thJA</sub>	110.0	°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-252(T)或 251T 或 251S 条管装 TUBE PACKING	SIF5N60F TO-251T-TU 或 TO-251S-TU 或 TO-252(T)-TU	SIF5N60F TO-251T-TU-HF 或 TO-251S-TU-HF 或
TO-252(T) 编带装 /TAPE & REEL PACKING	SIF5N60F TO-252(T)-TR	SIF5N60FTO-252(T)-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

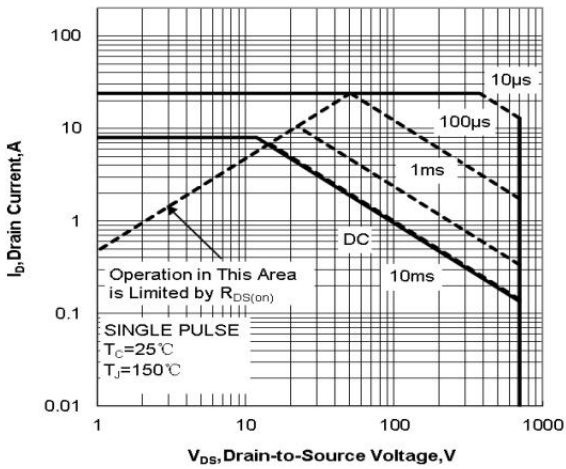


图 1 最大安全工作区曲线 (TO-220/262/263)  
Fig1 Maximum Safe Operating Area (TO-220/262/263)

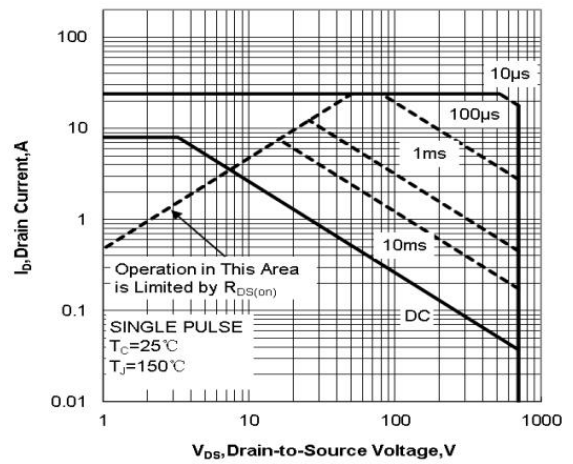


图 2 最大安全工作区曲线 (TO-220FP)  
Fig2 Maximum Safe Operating Area

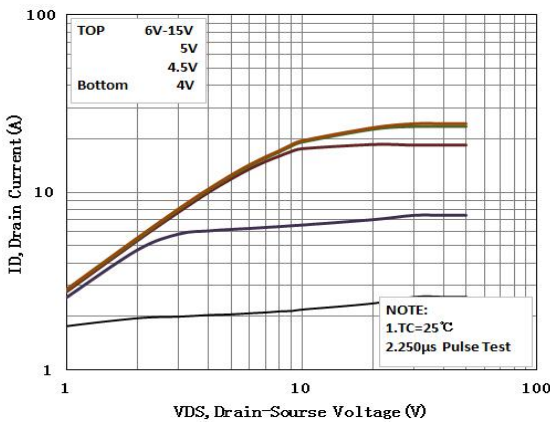


图 3 输出特性曲线, Tc=25°C  
Fig3 Typical Output Characteristics

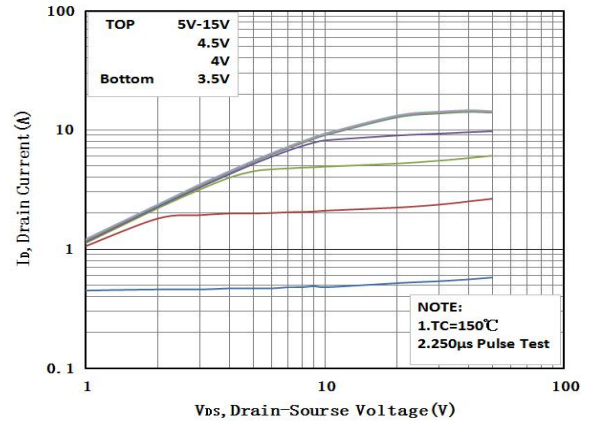


图 4 输出特性曲线, Tc=150°C  
Fig4 Typical Output Characteristics

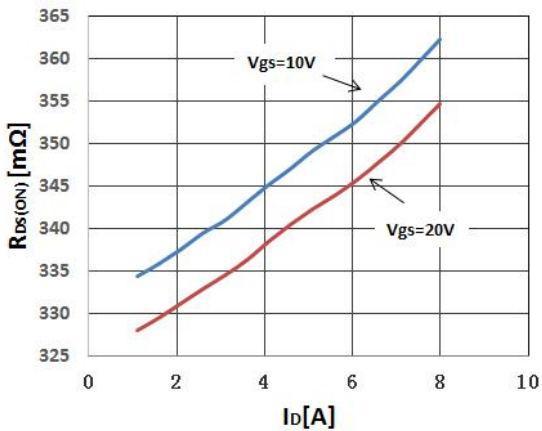


图 5 静态导通电阻与电流曲线  
Fig5 Static drain-source On-Resistance

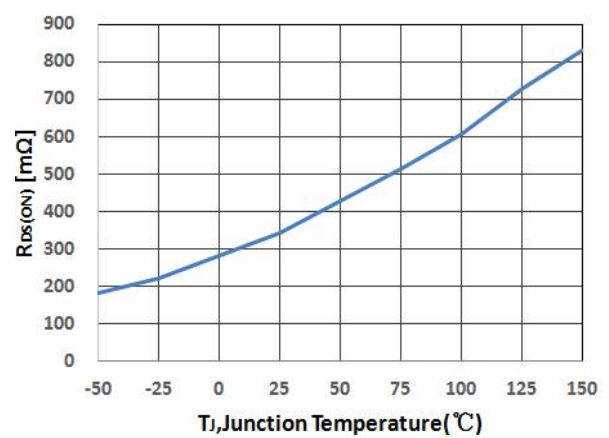


图 6 导通电阻与结温曲线  
Fig6 RDS(on) VS Junction Temperature

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● 特性曲线 Characteristic curve

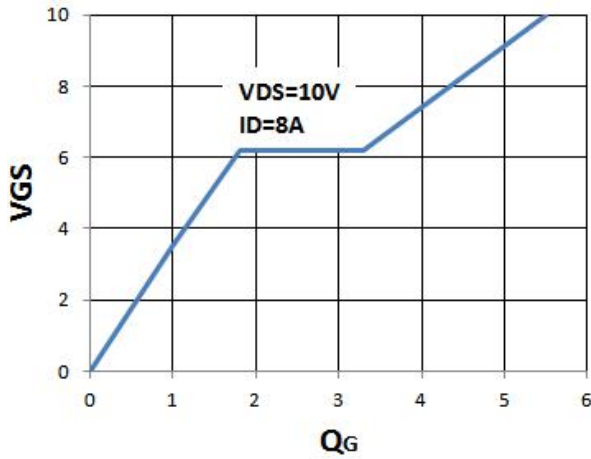


图 7 栅电荷与 VGS 关系曲线  
Fig7 Gate Charge waveforms

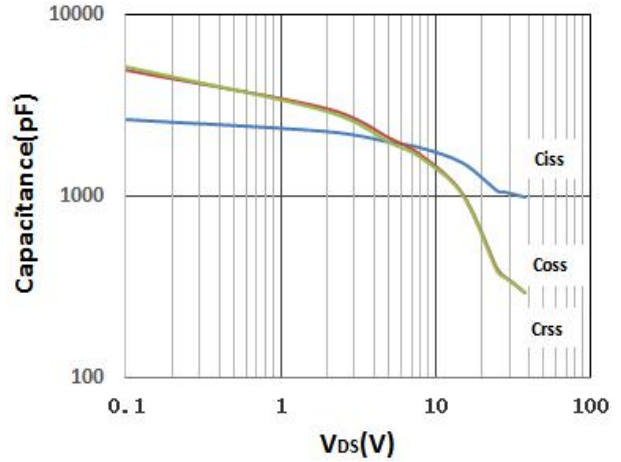


图 8 电容与漏源电压关系曲线  
Fig8 Capacitance

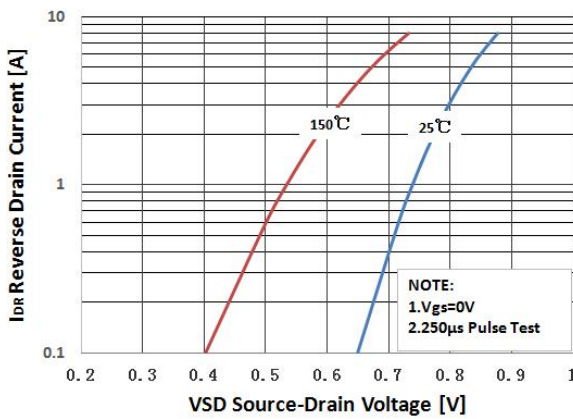


图 9 二极管正向电压曲  
Fig9 Typical Source-Drain Diode Forward Voltage

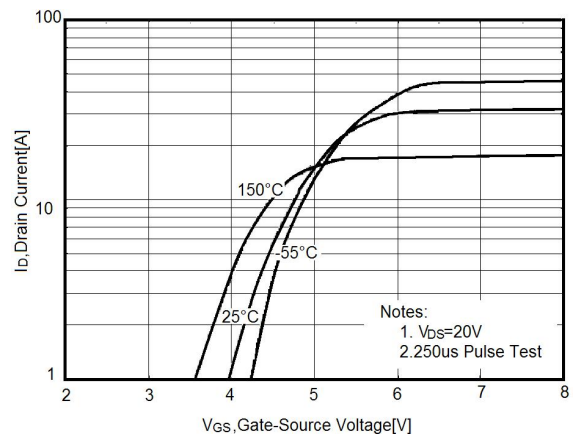


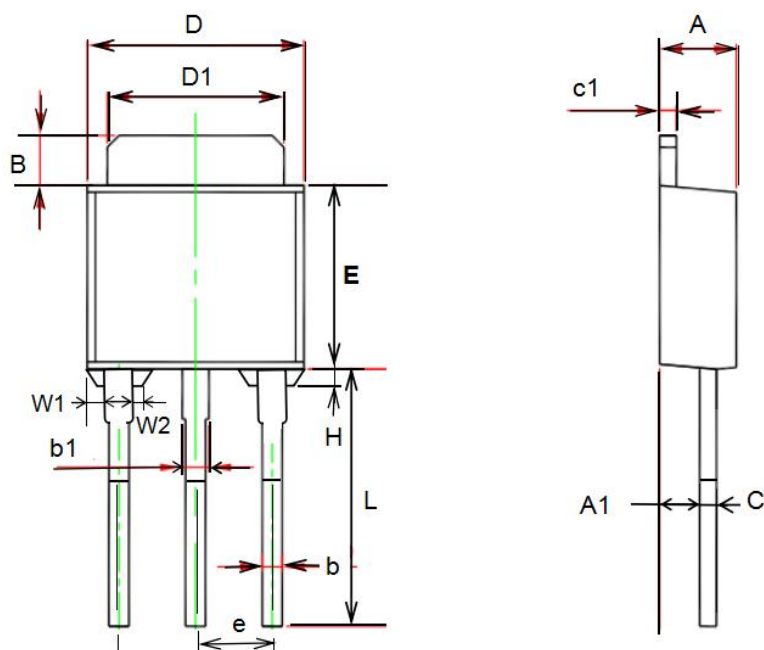
图 10 传输特性曲线  
Fig10 Transfer Characteristics

## TO-251T 封装机械尺寸 TO-251T (IPAK) MECHANICAL DATA

单位:毫米/UNIT: mm

符号/SYMBOL	最小值/min	典型值/nom	最大值/max
A	2.10		2.50
A <sub>1</sub>	0.95		1.30
B	0.80		1.25
b	0.50		0.80
b <sub>1</sub>	0.70		0.80
c	0.45		0.70
c <sub>1</sub>	0.45		0.70
D	6.35		6.80
D <sub>1</sub>	5.10		5.50
E	5.30		6.30
e	2.25	2.30	2.35
L	7.00		9.20
H	0.35		0.45
W1	0.30		0.50
W2	0.20		0.40

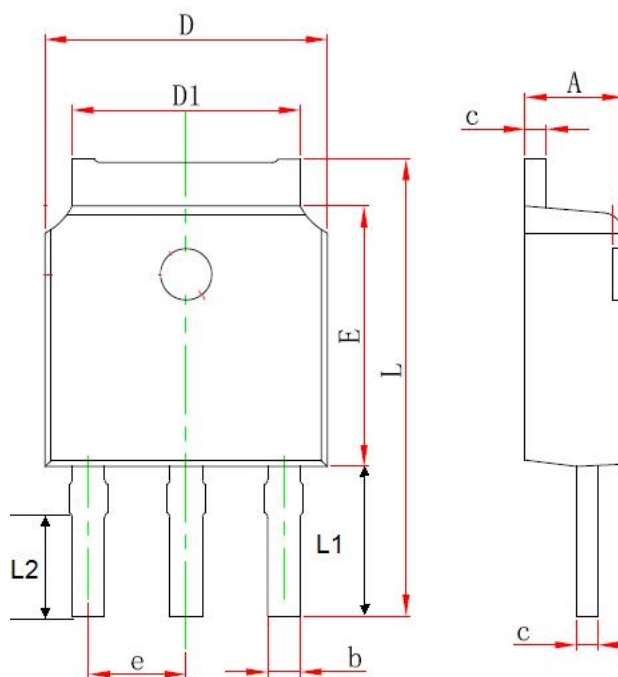
[S/L]



## TO-251S 封装机械尺寸 TO-251S (IPAK) MECHANICAL DATA

单位:毫米/UNIT: mm

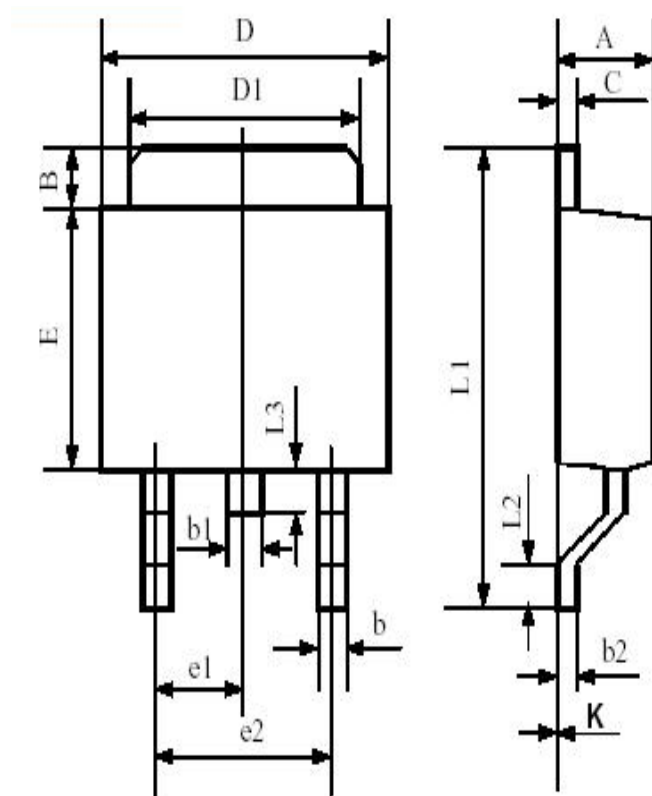
符号/SYMBOL	最小值/min	典型值/nom	最大值/max
A	2.20		2.40
b	0.50		0.85
C	0.45	0.50	0.60
D	6.50		6.70
D1	5.10		5.50
E	5.9		6.20
e	2.18	2.29	2.38
L	11.00		12.40
L1	4.8		5.3
L2	3.5		4.2



TO-252 封装机械尺寸  
TO-252 MECHANICAL DATA

单位:毫米/UNIT: mm

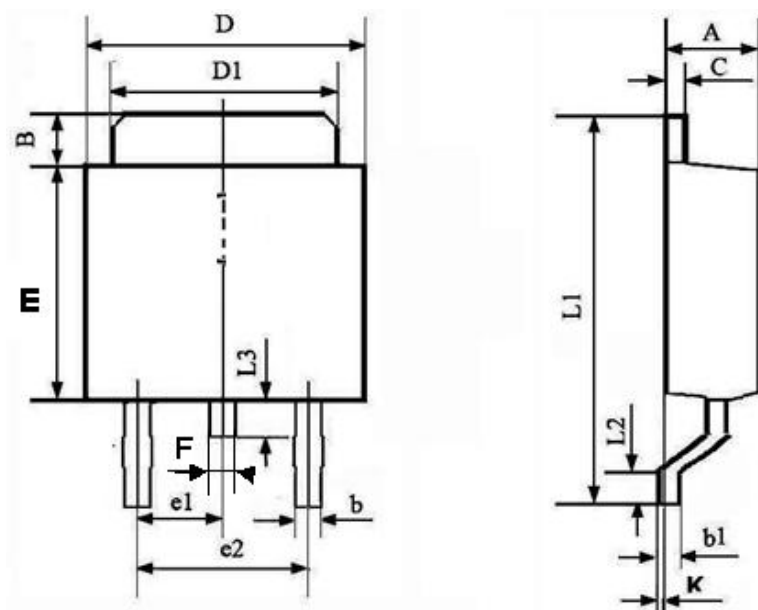
符号 SYMBOL	最小值 min	最大值 max	符号 SYMBOL	最小值 min	最大值 max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.70	1.20
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	-0.10	0.10			



## TO-252T 封装机械尺寸 TO-252T MECHANICAL DATA

单位:毫米/UNIT: mm

符号 SYMBOL	最小值 min	最大值 max	符号 SYMBOL	最小值 min	最大值 max
A	2.20	2.40	B	0.85	1.25
b	0.50	0.80	C	0.45	0.70
b1	0.45	0.70	D	6.30	6.70
D1	5.10	5.50	E	5.30	6.20
L1	9.20	10.60	F	0.50	0.90
L2	0.90	1.50	e1	2.25	2.35
L3	0.60	1.10	e2	4.50	4.70
			K	0.00	0.18



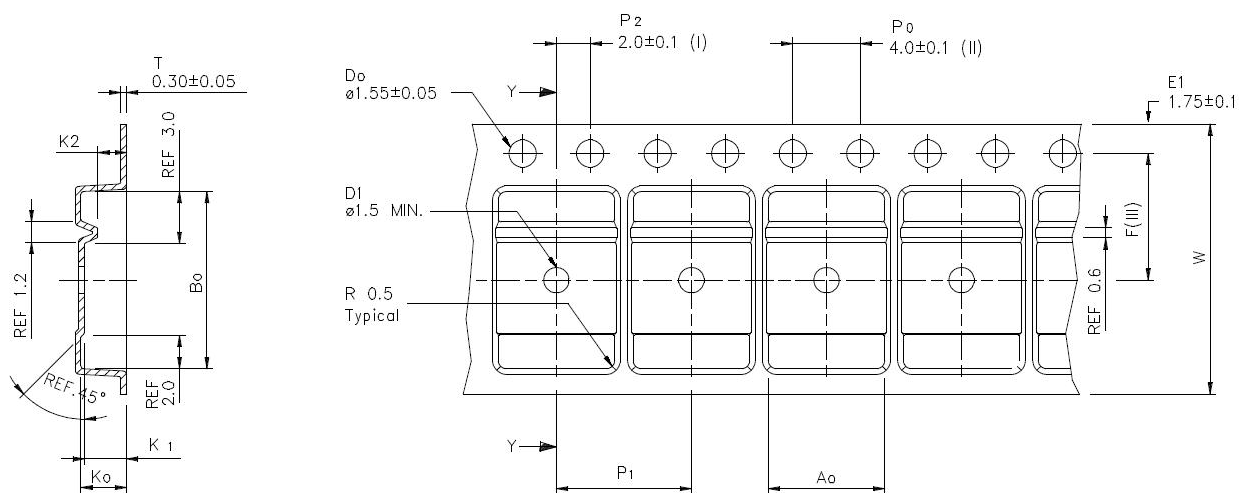
[L-J]



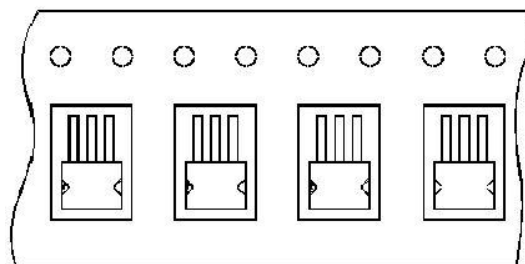
## TO-252 编带规格尺寸 TO-252 TAPE AND REEL DATA

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
A0	6.80	6.90	7.00	B0	10.40	10.50	10.60
K0	2.60	2.70	2.90	K1	2.40	2.50	2.60
F	7.40	7.50	7.60	K2	1.60	1.70	1.80
W	15.90	16.00	16.10	P1	7.90	8.00	8.10



使用供带方向/USER DIRECTION OF FEED



编带器件定位/UNIT ORIENTATION