

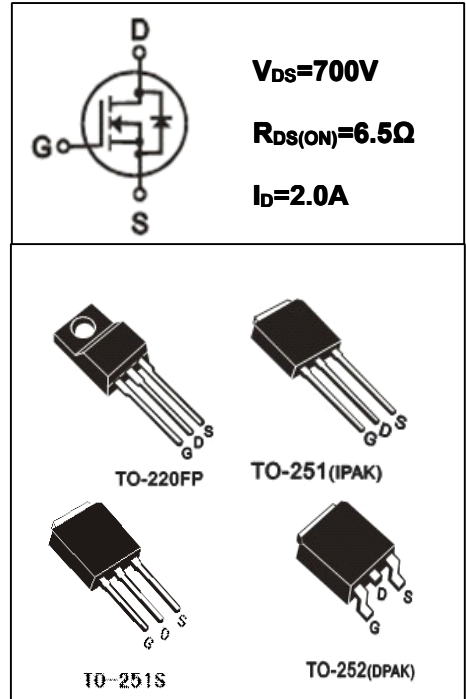
**N-沟道功率 MOS 管 / N-CHANNEL POWER MOSFET** ..... < A & B + \$

- 特点：导通电阻低 开关速度快 输入阻抗高 符合RoHS规范
- FEATURES: ■LOW ON-RESISTANCE ■FAST SWITCHING ■HIGH INPUT RESISTANCE ■RoHS COMPLIANT
- 应用：电子镇流器 电子变压器 开关电源
- APPLICATION: ■ELECTRONIC BALLAST ■ELECTRONIC TRANSFORMER ■SWITCH MODE POWER SUPPLY

●最大额定值 (Tc=25°C)

●Absolute Maximum Ratings (Tc=25°C) TO-220FP/251/251S/252

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>	± 30	V
漏极电流 Continuous Drain Current TC=25°C	I <sub>D</sub>	2.0*	A
漏极电流 Continuous Drain Current TC=100°C	I <sub>D</sub>	1.25*	A
最大脉冲电流 Drain Current — Pulsed ①	I <sub>DM</sub>	8.0*	A
耗散功率 Power Dissipation	P <sub>tot</sub>	TO-251/252 /220FP:28	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
单脉冲雪崩能量 Single Pulse Avalanche Energy ②	E <sub>AS</sub>	120	mJ



\*漏极电流由最高结温限制

\*Drain current limited by maximum junction temperature

●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
击穿电压温度系数 Breakdown Voltage Temperature Coefficient	ΔBV <sub>DSS</sub> / ΔT <sub>J</sub>	I <sub>D</sub> =250uA, Referenced to 25°C		0.6		V/°C
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			25	μA
		V <sub>DS</sub> =560V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C			250	μA
跨导 Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =1A ③		1.5		S

●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-220FP 条管装/TUBE PACKING	PT 2N70C TO-220FP-TU	PT 2N70C TO-220FP-TU-HF
TO-252 或 251 或 251S 条管装/TUBE PACKING	PT 2N70Q TO-251-TU 或 TO-251S-TU 或 TO-252-TU	PT 2N70Q TO-251-TU-HF 或 TO-251S-TU 或 TO-252-TU-HF
TO-252 编带装/TAPE & REEL PACKING	PT 2N70S TO-252-TR	PT 2N70S TO-252-TR-HF

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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
栅极漏电流 Gate-body Leakage Current ( $V_{DS} = 0$ )	$I_{GSS}$	$V_{GS} = \pm 30V$			$\pm 100$	nA
漏-源导通电阻 Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 1A$ ③		5.5	6.5	$\Omega$
输入电容 Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V$ $F = 1.0MHz$		311		pF
关断延迟 Turn -Off Delay Time	$T_d(off)$	$V_{DD} = 300V, I_D = 2.0A$ $R_G = 25\Omega$ ③		24		ns
栅极电荷 Total Gate Charge	$Q_g$	$I_D = 2.0A, V_{DS} = 560V$ $V_{GS} = 10V$ ③		14.5		nC
栅源电荷 Gate-to-Source Charge	$Q_{gs}$			1.8		nC
栅漏电荷 Gate-to-Drain Charge	$Q_{gd}$			8.3		nC
二极管正向电流 Continuous Diode Forward Current	$I_S$				2.0	A
二极管正向压降 Diode Forward Voltage	$V_{SD}$	$T_j = 25^\circ C, I_S = 2.0A$ $V_{GS} = 0V$ ③			1.4	V
反向恢复时间 Reverse Recovery Time	$t_{rr}$	$T_j = 25^\circ C, I_f = 2.0A$ $di/dt = 100A/\mu s$ ③		380		ns
反向恢复电荷 Reverse Recovery Charge	$Q_{rr}$			0.9		$\mu C$

● 热特性

● Thermal Characteristics

参数 PARAMETER	符号 SYMBOL	最大值 MAX	最大值 MAX	单位 UNIT
		TO-220	TO-251/251S/252/220FP	
热阻结-壳 Thermal Resistance Junction-case	$R_{thJC}$	2.5	4.46	$^\circ C/W$
热阻结-环境 Thermal Resistance Junction-ambient	$R_{thJA}$	110.0	110.0	$^\circ C/W$

注释(Notes):

- ① 脉冲宽度：以最高结温为限制  
 Repetitive rating: Pulse width limited by maximum junction temperature
- ② 初始结温= $25^\circ C$ ,  $V_{DD} = 50V$ ,  $L = 56mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 2.0A$   
 Starting  $T_j = 25^\circ C$ ,  $V_{DD} = 50V$ ,  $L = 56mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 2.0A$
- ③ 脉冲测试：脉冲宽度  $\leq 300\mu s$ ，占空比  $\leq 2\%$   
 Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$

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● 特性曲线

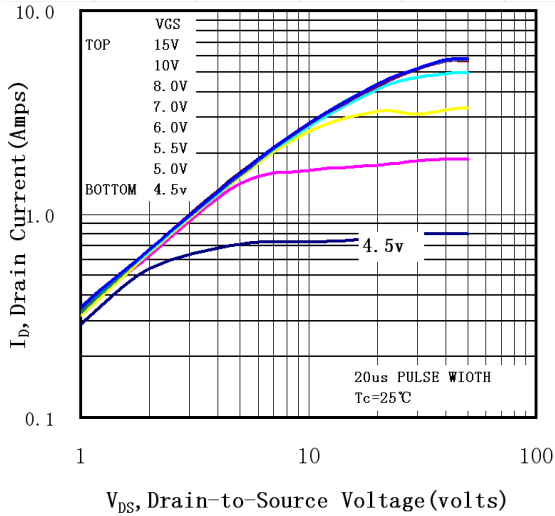


图 1 输出特性曲线, Tc=25°C

Fig1 Typical Output Characteristics, Tc=25°C

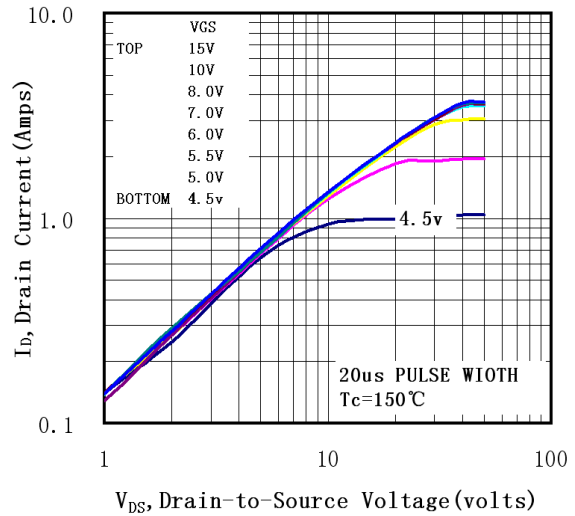


图 2 输出特性曲线, Tc=150°C

Fig2 Typical Output Characteristics, Tc=150°C

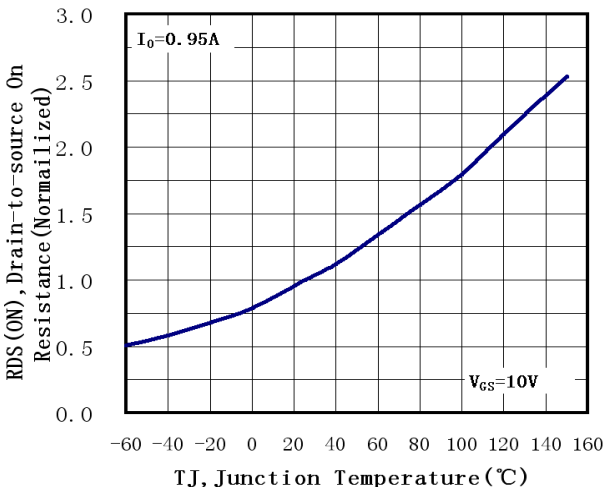


图 3 归一化导通电阻与温度曲线

Fig3 Normalized Resistance Vs. Temperature

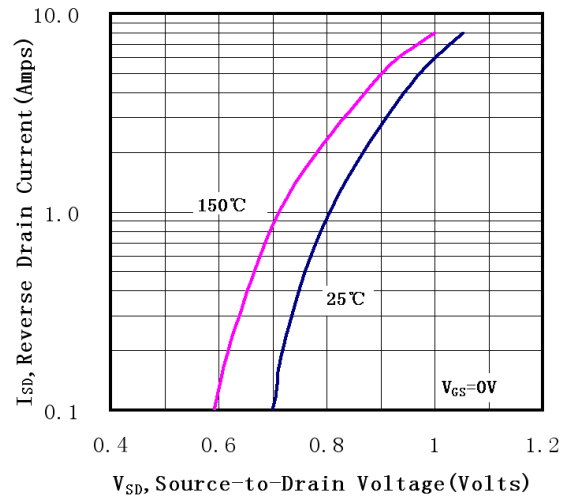


图 4 二极管正向压降曲线

Fig4 Typical Source-Drain Diode Forward Voltage

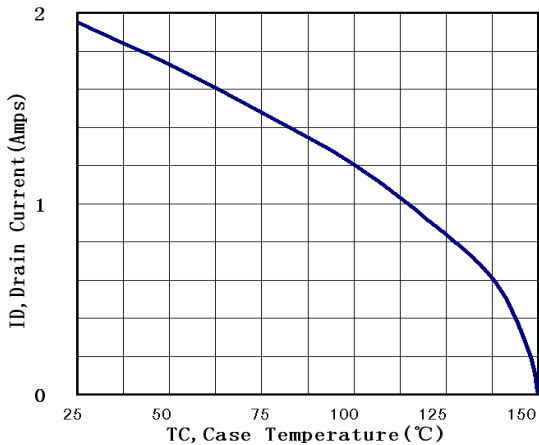


图 5 最大漏极电流与壳温曲线

Fig5 Maximum Drain Current Vs. Case Temperature

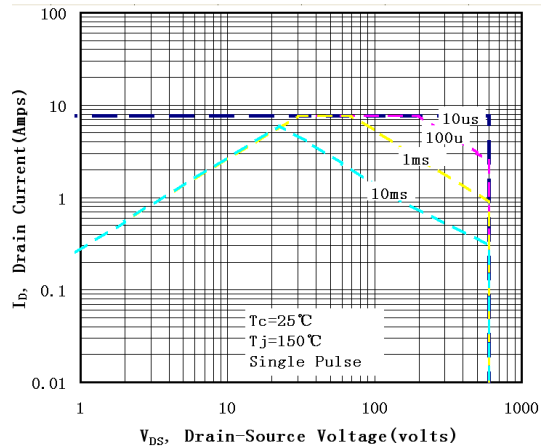


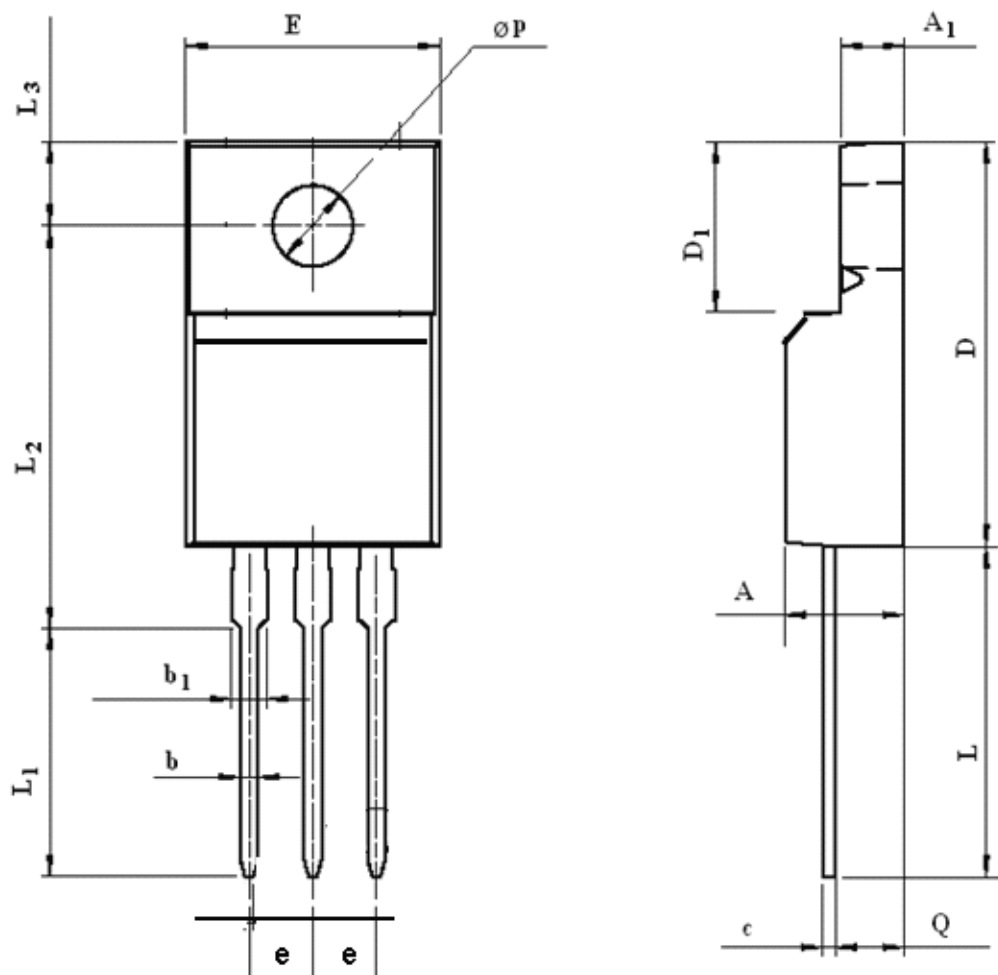
图 6 最大安全工作区曲线

Fig6 Maximum Safe Operating Area

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

单位:毫米/UNIT: mm

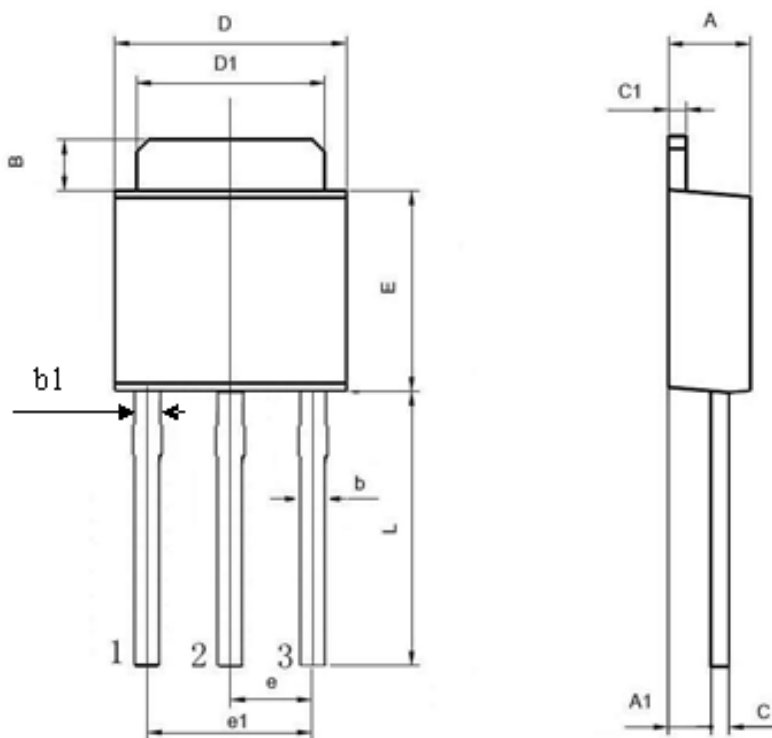
符号 SYMBOL	最小值 min	典型值 nom	最大值 max	符号 SYMBOL	最小值 min	典型值 nom	最大值 max
A	4.40		4.95	e		2.54	
A <sub>1</sub>	2.30		2.90	L	12.50		14.30
b	0.45		0.90	L <sub>1</sub>	9.10		10.05
b <sub>1</sub>	1.10		1.70	L <sub>2</sub>	15.00		16.00
c	0.35		0.90	L <sub>3</sub>	3.00		4.00
D	14.50		17.00	øp	3.00		3.50
D1	6.10		9.00	Q	2.30		2.80
E	9.60		10.30				



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

单位:毫米/UNIT: mm

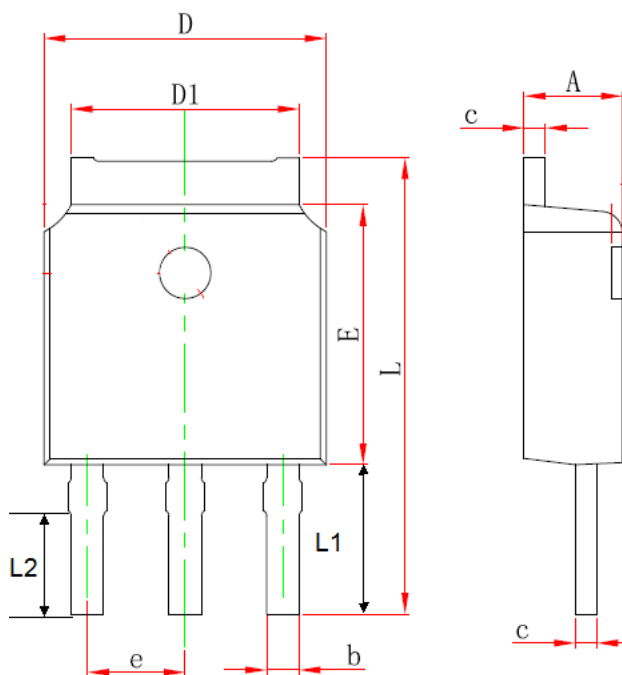
符号/SYMBOL	最小值/min	典型值/nom	最大值/max
A	2.10		2.50
A <sub>1</sub>	0.95		1.30
B	0.80		1.25
b	0.50		0.80
b <sub>1</sub>	0.70		0.90
c	0.45		0.70
c <sub>1</sub>	0.45		0.70
D	6.35		6.80
D <sub>1</sub>	5.10		5.50
E	5.30		6.30
e	2.25	2.30	2.35
L	7.00		9.20



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

单位:毫米/UNIT: mm

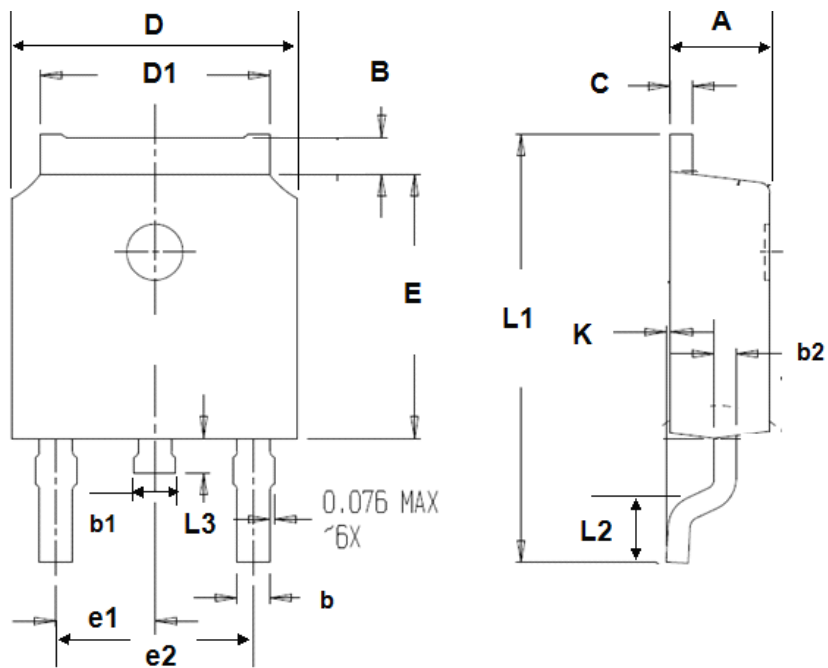
符号/SYMBOL	最小值/min	典型值/nom	最大值/max
A	2.20		2.40
b	0.60		0.85
C	0.45	0.50	0.60
D	6.50		6.70
D1	5.10		5.50
E	5.9		6.20
e	2.18	2.29	2.38
L	11.00		12.40
L1	4.8		5.3
L2	3.5		4.2



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

单位:毫米/UNIT: mm

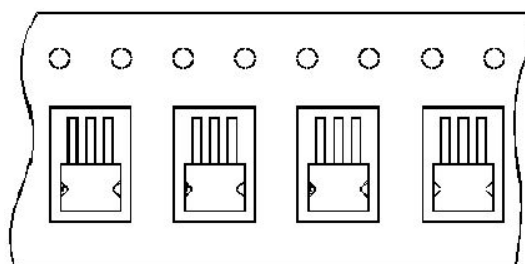
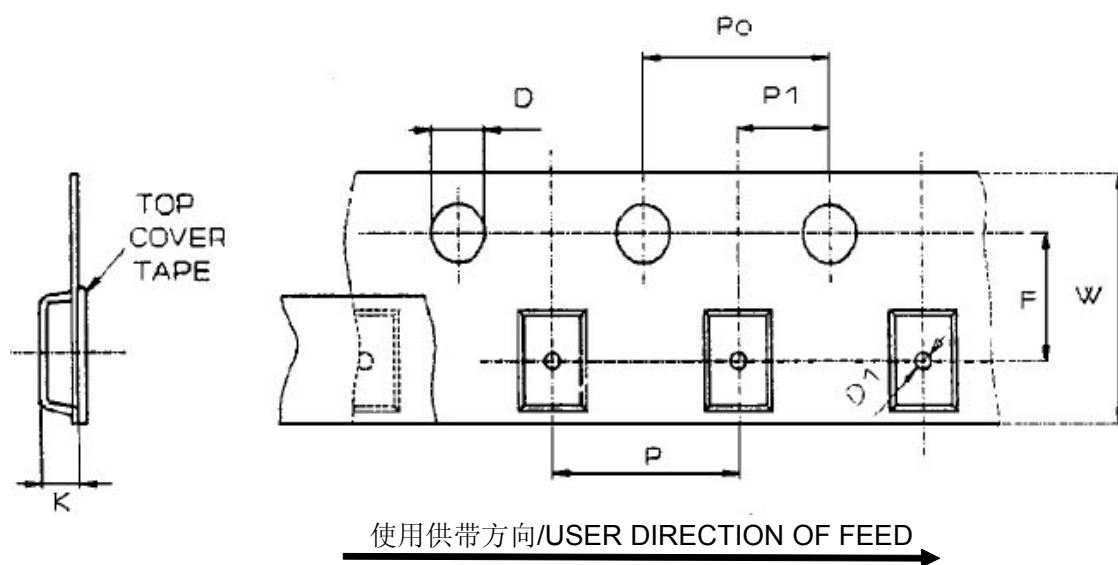
符号 SYMBOL	最小值 min	最大值 max	符号 SYMBOL	最小值 min	最大值 max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			



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

单位:毫米/UNIT: mm

符号 <b>SYMBOL</b>	最小值 <b>min</b>	最大值 <b>max</b>	符号 <b>SYMBOL</b>	最小值 <b>min</b>	最大值 <b>max</b>
W	16.0-0.3	16.0+0.3	F	7.5-0.1	7.5+0.1
P0	4.0-0.1	4.0+0.1	D	1.5-0.0	1.5+0.1
P	8.0-0.1	8.0+0.1	P1	2.0-0.1	2.0+0.1
K	2.65	2.80	D1	1.5-0.0	1.5+0.1



编带器件定位/UNIT ORIENTATION