

## N-沟道功率 MOS 管/ N-CHANNEL POWER MOSFET

SIF24N20

●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：SMPS 高效同步整流 不间断电源 高速功率开关 硬开关高频电路 照明

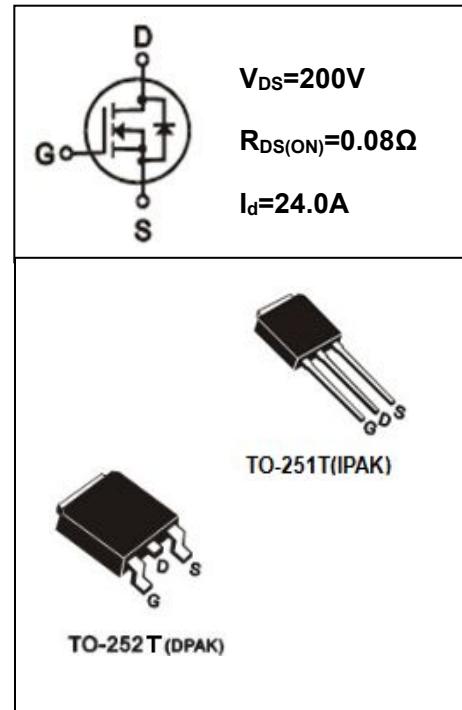
●APPLICATION: ■High Efficiency Synchronous Rectification in SMPS ■UPS ■Lighting

■High Speed Power Switching ■Hard Switched and High Frequency Circuits

●最大额定值 (Tc=25°C)

●Absolute Maximum Ratings (Tc=25°C) TO-251T&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>	200	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>	24	A
漏极电流 Continuous Drain Current TC=100°C	I <sub>D</sub>	12	A
最大脉冲电流 Drain Current -Pulsed ①	I <sub>DM</sub>	96	A
耗散功率 Power Dissipation	P <sub>tot</sub>	33	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>	576	mJ



●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	200			V
击穿电压温度系数 Breakdown Voltage Temperature Coefficient	Δ BV <sub>DSS</sub> / Δ T <sub>j</sub>	I <sub>D</sub> =250μA, Referenced to 25°C		0.5		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> =200V, V <sub>GS</sub> =0V, T <sub>j</sub> =25°C			1	μA
		V <sub>DS</sub> =200V, V <sub>GS</sub> =0V, T <sub>j</sub> =125°C			10	μA
跨导 Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =12A ③	10.0			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-252T 或 251T 条管装/TUBE PACKING	SIF24N20 TO-251T-TU 或 TO-252T-TU	SIF24N20 TO-251T-TU-HF 或 TO-252T-TU-HF
TO-252T 编带装/TAPE & REEL PACKING	SIF24N20 TO-252T-TR	SIF24N20 TO-252T-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 ( $V_{DS} = 0$ )	$I_{GSS}$	$V_{GS} = \pm 20V$			$\pm 100$	nA
漏-源导通电阻 Static Drain-source On Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 12A$ ③		85	95	mΩ
输入电容 Input Capacitance	$C_{iss}$			1360		pF
输出电容 Output Capacitance	$C_{oss}$	$V_{GS} = 0V, V_{DS} = 25V$ $F = 1.0MHz$		185		pF
米勒电容 Miller Capacitance	$C_{rss}$			15		pF
关断延迟 Turn -Off Delay Time	$T_{d(off)}$	$V_{DD} = 160V, I_D = 15A$ $R_G = 3.5\Omega, R_D = 25\Omega$ ③		26.5		ns
栅极电荷 Total Gate Charge	$Q_g$			27.5		nC
栅源电荷 Gate-to-Source Charge	$Q_{gs}$	$I_D = 15A, V_{DS} = 100V$ $V_{GS} = 10V$ ③		6.5		nC
栅漏电荷 Gate-to-Drain Charge	$Q_{gd}$			8.6		nC
二极管正向电流 Continuous Diode Forward Current	$I_s$				24.0	A
二极管正向压降 Diode Forward Voltage	$V_{SD}$	$T_j = 25^\circ C, I_s = 24A$ $V_{GS} = 0V$ ③			1.45	V
反向恢复时间 Reverse Recovery Time	$t_{rr}$	$T_j = 25^\circ C, I_f = 15A, V_r = 100V$ $di/dt = 100A/\mu s$ ③			78	ns
反向恢复电荷 Reverse Recovery Charge	$Q_{rr}$			295		nC

●热特性

●Thermal Characteristics

参数 PARAMETER	符号 SYMBOL	最大值 MAX	单位 UNIT
热阻结-壳 Thermal Resistance Junction-case	$R_{thJC}$	3.8	°C/W
热阻结-环境 Thermal Resistance Junction-ambient	$R_{thJA}$	62.5	°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= $25^\circ C$ ,  $V_{DD} = 50V$ ,  $L = 1.5mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 20A$

Starting  $T_j = 25^\circ C$ ,  $V_{DD} = 50V$ ,  $L = 1.5mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 20 A$

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

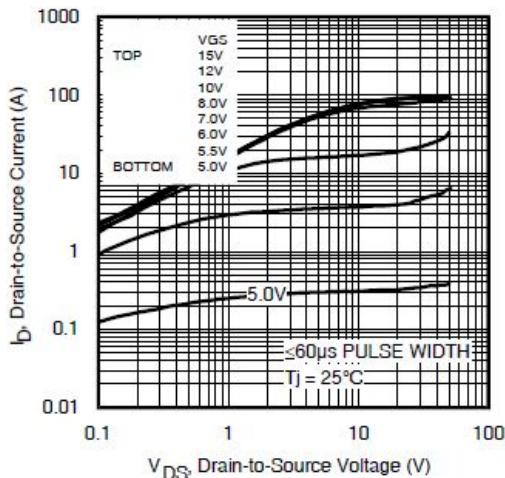


图 1 输出特性曲线,  $T_c=25^\circ C$

Fig1 Typical Output Characteristics,  $T_c=25^\circ C$

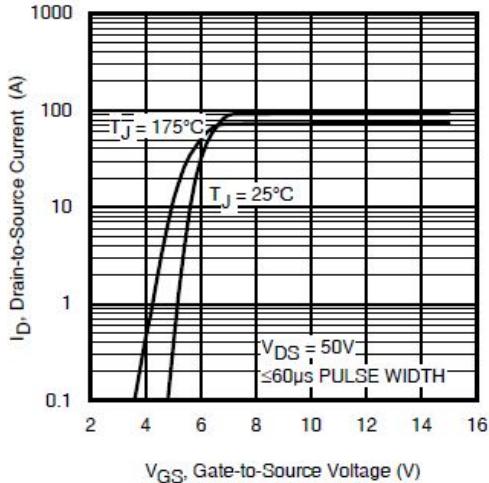


图 2 典型的转移特性曲线

Fig2 Typical Transfer Characteristics

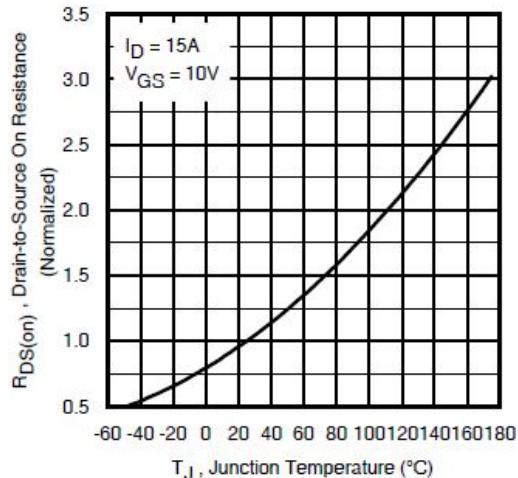


图 3 导通电阻与温度曲线

Fig3 Normalized On-Resistance Vs. Temperature

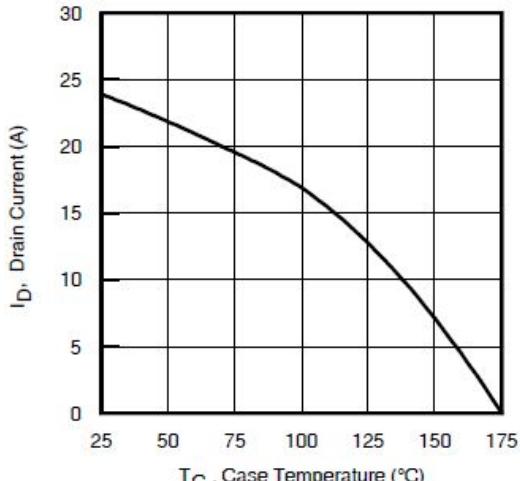


图 5 最大 Id 电流与管壳温度

Fig5 Maximum Drain Current vs. Case Temperature

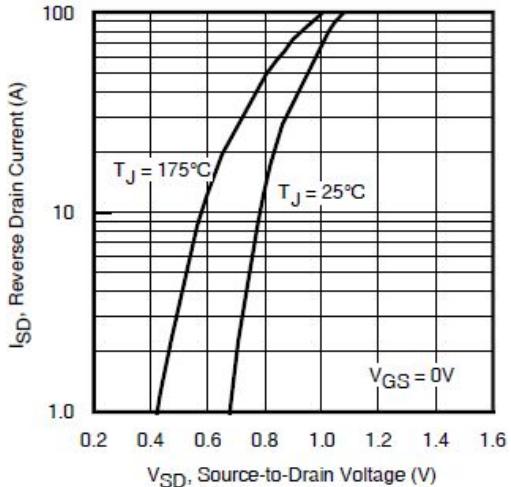


图 4 二极管正向压降与温度曲线

Fig4 Typical Source-Drain Diode Forward Voltage

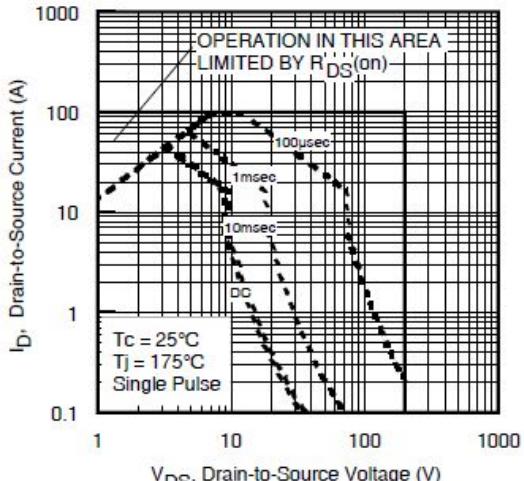


图 6 最大安全工作区

Fig6 Maximum Safe Operating Area

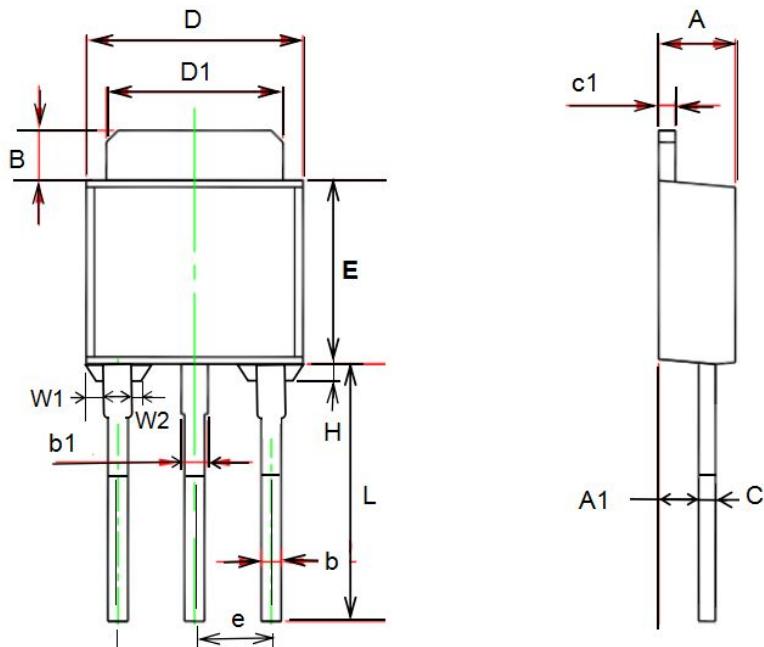
## TO-251T 封装机械尺寸

### 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
W <sub>1</sub>	0.30		0.50
W <sub>2</sub>	0.20		0.40

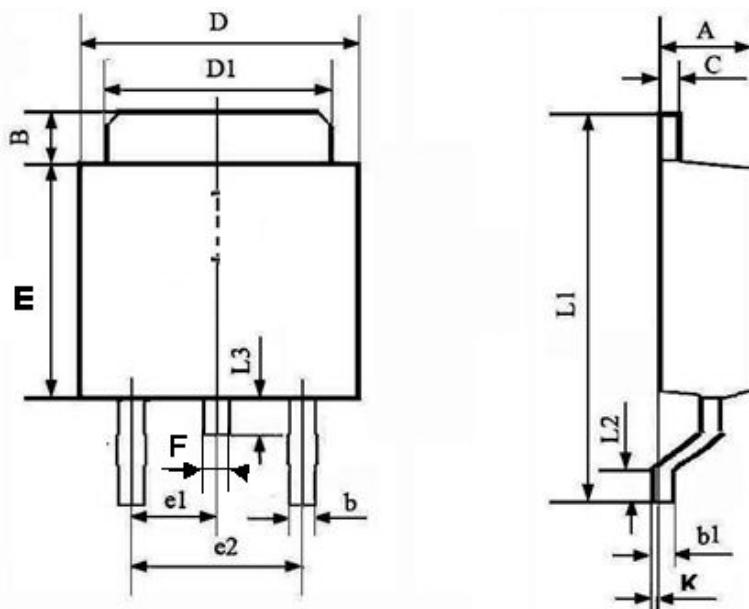
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## TO-252T 封装机械尺寸 TO-252T MECHANICAL DATA

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>
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

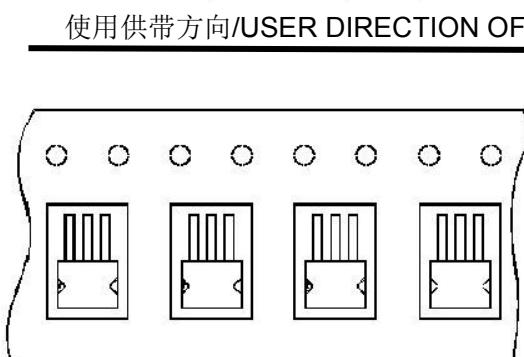
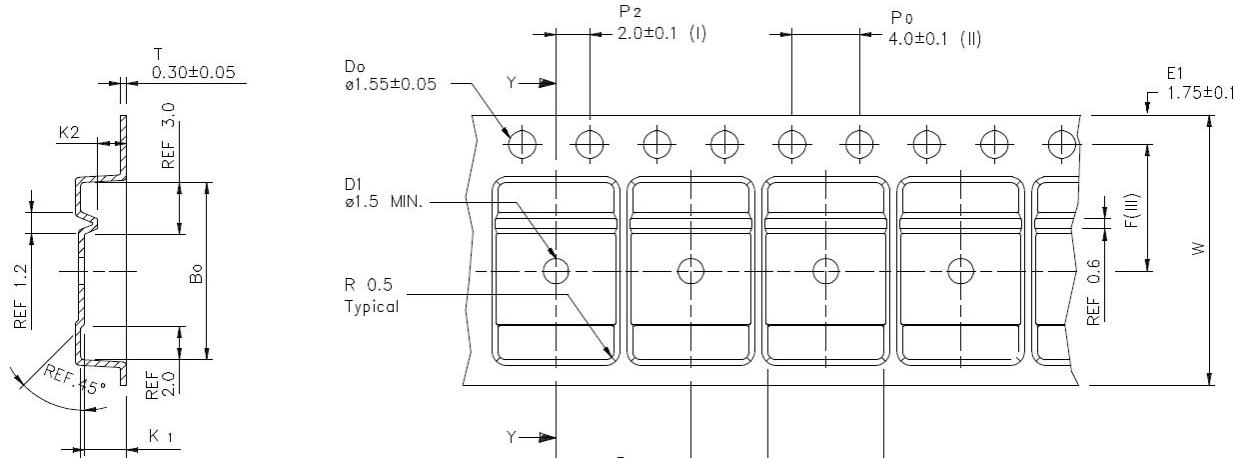


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## TO-252 编带规格尺寸 TO-252 TAPE AND REEL DATA

单位:毫米/UNIT: mm

符号 <b>SYMBOL</b>	最小值 <b>min</b>	典型值 <b>nom</b>	最大值 <b>max</b>	符号 <b>SYMBOL</b>	最小值 <b>min</b>	典型值 <b>nom</b>	最大值 <b>max</b>
A <sub>0</sub>	6.80	6.90	7.00	B <sub>0</sub>	10.40	10.50	10.60
K <sub>0</sub>	2.60	2.70	2.90	K <sub>1</sub>	2.40	2.50	2.60
F	7.40	7.50	7.60	K <sub>2</sub>	1.60	1.70	1.80
W	15.90	16.00	16.10	P <sub>1</sub>	7.90	8.00	8.10



编带器件定位/UNIT ORIENTATION