LPD6208

17V/0.2A 有刷直流电机 H 桥驱动芯片

功能特性

- 独立H桥电机驱动器
- 可支持双向直流电机正转、反转、刹车
- 17V耐压，支持3.0V到15V工作电压
- 单通道最大连续电流输出能力：200mA typ
- 单通道限电流：300mA typ
- 较低的导通内阻
- 支持100%占空比输出
- 支持PWM输入模式，最高频率可支持100kHz
- 兼容1.8V，3.3V和 5V输入电压逻辑
- 集成保护特性：
  - VCC欠压锁定
  - 过温保护
  - 输出限流保护
- 低功耗休眠模式： 小于2uA
- ESD等级:
  - Human Body Model: 2kV
  - Charged Device Model: 1kV
- 封装: SOP-8, SOT23-6
- 符合RoHS标准，无铅

应用

- 安防摄像头
- 双向马达驱动
- 电子玩具

基本说明

LPD6208是一款可驱动一个双向直流电机或一个步进电机的绕组等负载的H桥驱动芯片，适用于安防摄像头，电子玩具等场景。

LPD6208输入端兼容1.8V、3.3V和5V电平，支持最高PWM输入最高频率100kHz，具有良好的抗干扰性；内部逻辑控制电路可控制双向直流电机正转、反转和刹车。

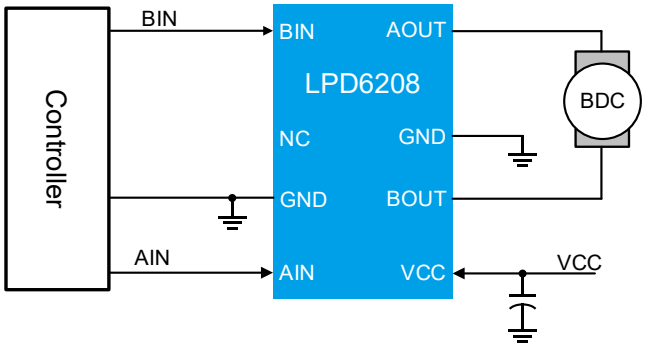
LPD6208集成了输入欠压锁定保护，限电流保护和过温保护等功能，当故障移除时，芯片可自动恢复。

订购信息

LPD6208 □□ □

- F: Pb-Free
- Package Type
  - SO: SOP8
  - B6: SOT23-6

典型线路图



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产品信息

产品型号	Top Marking	Moisture Sensitivity Level	Package	Shipping
LPD6208SOF	LPS LPD6208 YWX	MSL3	SOP8	4K/REEL
LPD6208B6F	LPD6208 LFYWX	MSL3	SOT23-6	3K/REEL
Marking indication: Y: Year code. W: Week code. X: Batch numbers.				

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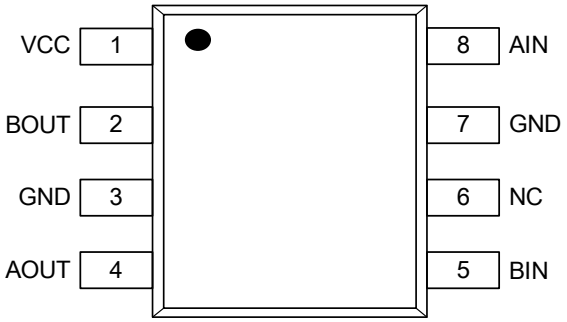
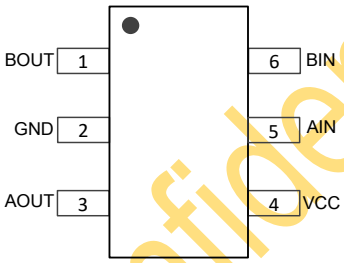
引脚排列图



SOP8（top view）



SOT23-6（top view）

引脚描述

引脚序号 SOP8	引脚序号 SOT23-6	名称	描述
1	4	VCC	电源电压
2	1	BOUT	H 桥 B 路输出引脚
3,7	2	GND	参考地
4	3	AOUT	H 桥 A 路输出引脚
5	6	BIN	H 桥控制 B 路逻辑输入
6	-	NC	
8	5	AIN	H 桥控制 A 路逻辑输入

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绝对最大额定值 (Note 1)

VCC to GND ---------- -0.3~17V
AOUT, BOUT to GND ---------- -0.7~VCC+0.7V
AIN, BIN to GND ---------- -0.3~6V
Maximum Junction Temperature (T_J) ---------- 150℃
Maximum Soldering Temperature (at leads, 10 sec) ---------- 260℃
Storage Temperature Range(T_{STG}) ---------- -65~125℃

Note 1. Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ESD等级

HBM (Human Body Model) ---------- 2000V
CDM (Charged Device Model) ---------- 1000V

推荐工作条件

VCC to GND ---------- 3.0V to 15V
AIN, BIN to GND ---------- 0~5.5V
I_{OUT_RMS} ---------- 0.1A
Operating Junction Temperature Range (T_J) ----------40℃ to 125℃

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电气特性

(The specifications are at T_A=25℃，VCC = 12V, unless otherwise noted.)

SYMBOL	PARAMETER	CONDITION	MIN	TYP	MAX	UNITS
供电电压电流						
V_{CC}	VCC 工作电压		3.0		15	V
I_{Q_VCC}	VCC 休眠电流	AIN=BIN=L		1.0	2.0	μA
I_{OP_VCC}	VCC 动态工作电流	AIN or BIN=H，空载		0.3		mA
V_{CC_ON}	VCC 开启电压	AIN or BIN=2V		2.4		V
V_{CC_OFF}	VCC 关断电压	AIN or BIN=2V		2.3		V
AIN, BIN 逻辑输入						
V_{IH_TH}	逻辑高电平阈值电压		1.5			V
V_{IL_TH}	逻辑低电平阈值电压				0.5	V
I_{IH_TH}	高电平输入偏置电流	AIN=BIN=3.3V		330		μA
I_{IL_TH}	低电平输入偏置电流	AIN=BIN=0V	-1	0	1	μA
R_{PD}	下拉电阻			10		kΩ
Motor Driver 输出						
R_{HS_ON}	上管导通电阻	VCC=12V, I=100mA		5		Ω
R_{LS_ON}	下管导通电阻	VCC=12V, I=100mA		1.5		Ω
t_{DEAD}	死区时间			200		ns
t_{RISE}	输出上升时间	VCC=12V, OUT输出从10%到90%		80		ns
t_{FALL}	输出下降时间	VCC=12V, OUT输出从90%到10%		20		ns
t_{PD}	输入到输出传播延迟	xIN为高到xOUT为高电平		250		ns
V_D	体二极管导通压降	I=100mA		0.8	1	V
保护电路						
I_{LIMIT}	限流保护阈值		0.2	0.3		A
T_{SD}	过温保护阈值			150		℃
T_{SD_HYS}	过温保护迟滞			30		℃

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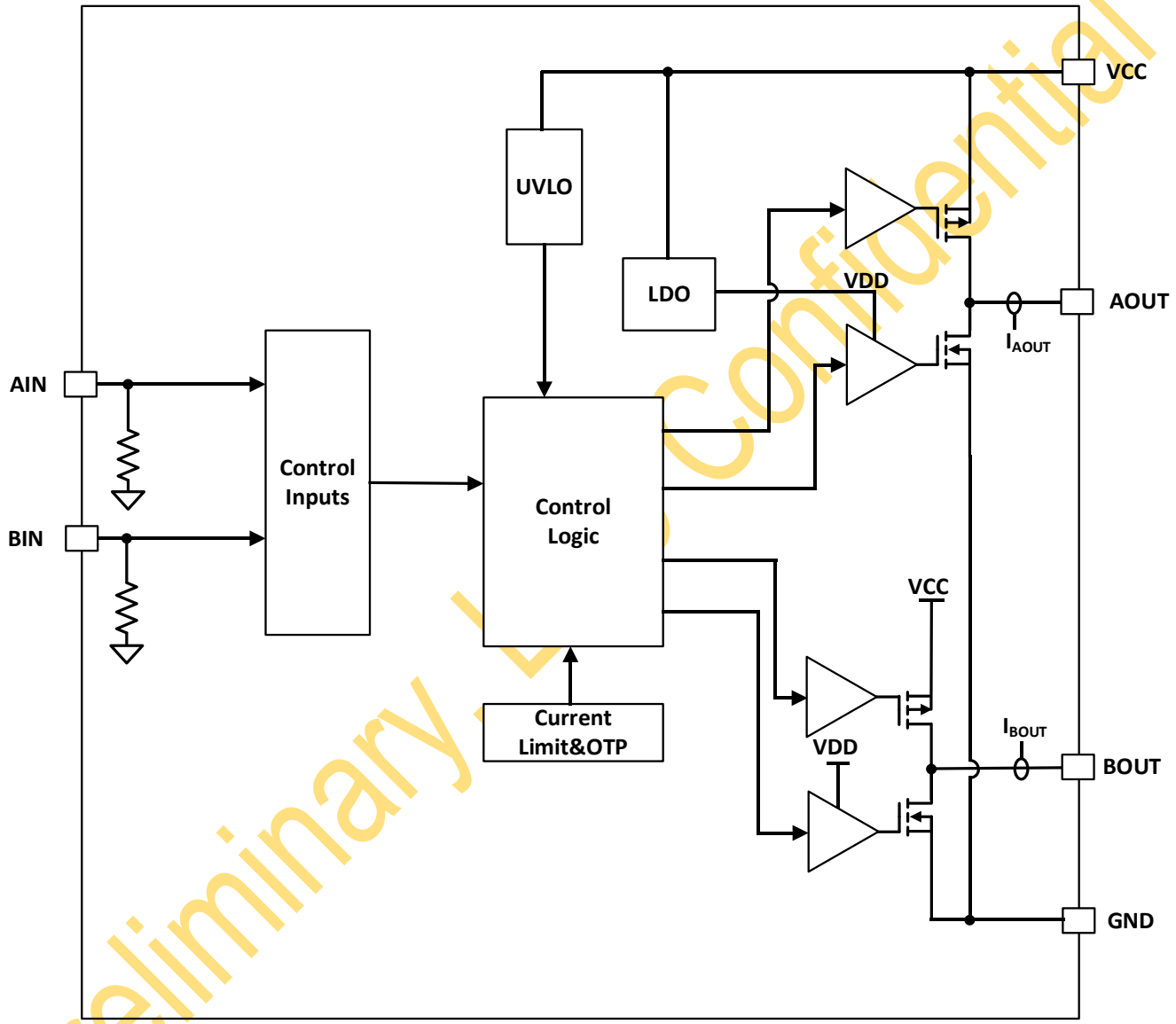
原理框图



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功能描述

概述

LPD6208是一款可驱动一个双向直流电机或一个步进电机的绕组等负载的H桥驱动芯片。LPD6208集成了4个较低导通电阻的MOSFET，最大连续输出电流达到200mA，工作电压支持3.0V至15V，适用于安防，电子玩具等双向马达的场景。LPD6208集成的上管采用PMOSFET，可实现高测100%占空比运行。电机转速可通过两个输入的PWM信号进行调节，当两个输入信号都为低时，LPD6208会进入低功耗休眠模式

LPD6208集成了多种保护功能。这些保护功能包括欠压锁定(UVLO)、限流保护和过热关断(TSD)。

LPD6208通过限制高侧功率MOSFET上的输出电流来达到限制负载电流，当负载达到限流点时，输出电压AOUT、BOUT的电压会下降从而实现按照限流电流值工作。

控制模式

LPD6208系列器件支持PWM控制模式，控制逻辑如下。

AIN	BIN	OUT1	OUT2	说明
0	0	HI-Z	HI-Z	睡眠（H桥高阻抗）
0	1	L	H	后退，OUT2->OUT1
1	0	H	L	前进，OUT1->OUT2
1	1	L	L	制动（低侧慢速衰减）

死区时间

当H桥输出OUTx从高变到低或者从低变为高输出时，芯片会自动在切换过程中增加死区时间防止上下管直通而损坏集成的MOSFET。在死区时间内，上下管均为关断状态。

VCC UVLO

VCC引脚上的电源电压降至欠压锁定阈值电压(VCC_OFF)以下，就会禁用H桥中的所有MOSFET。当欠压条件消失且 VCC 升至 VCC_ON 阈值以上时， 将恢复正常运行。

OUT限流保护

即使发生了硬短路事件，上管MOSFET上的模拟电流限制电路会限制器件输出的电流，维持这个输出电流输出，OUT电压会根据输出情况下降。

热关断

如果裸片温度超过过热限制T_{SD}，则会禁用 H 桥中的所有 MOSFET。当过热条件消失且裸片温度降至(T_{SD}-T_{SD_HYS})以下时，将恢复正常运行。

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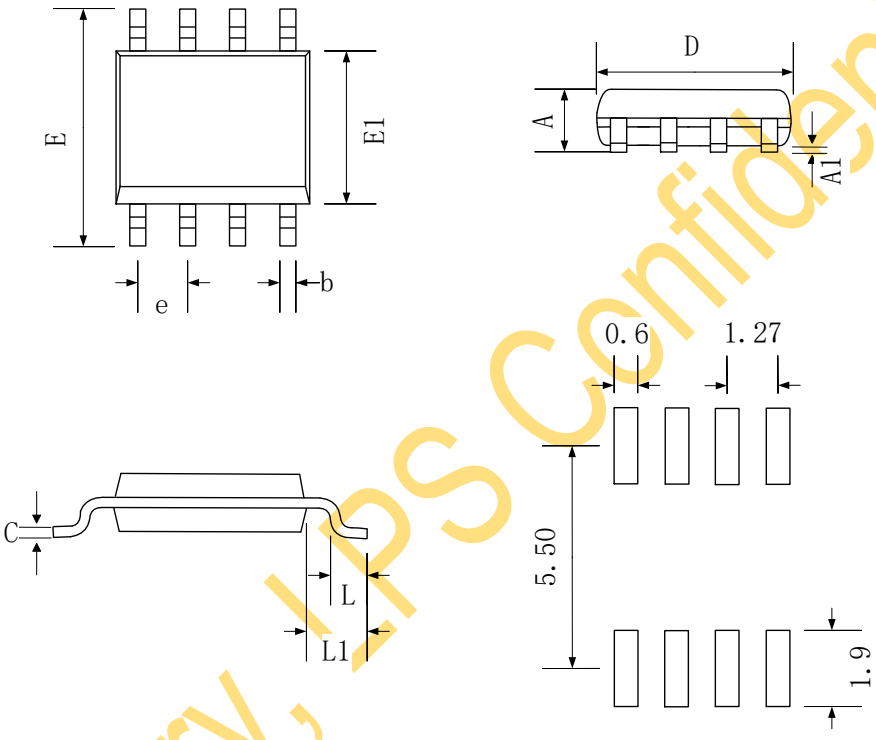
封装信息

SOP8



Recommended Land Pattern

SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
A	1.35	-	1.75
A1	0.10	-	0.25
b	0.30	0.40	0.50
c	0.20 REF		
D	4.70	4.90	5.10
E	5.70	6.00	6.30
E1	3.70	3.90	4.10
e	1.27 BSC		
L	0.40	0.60	0.80
L1	1.05 REF		

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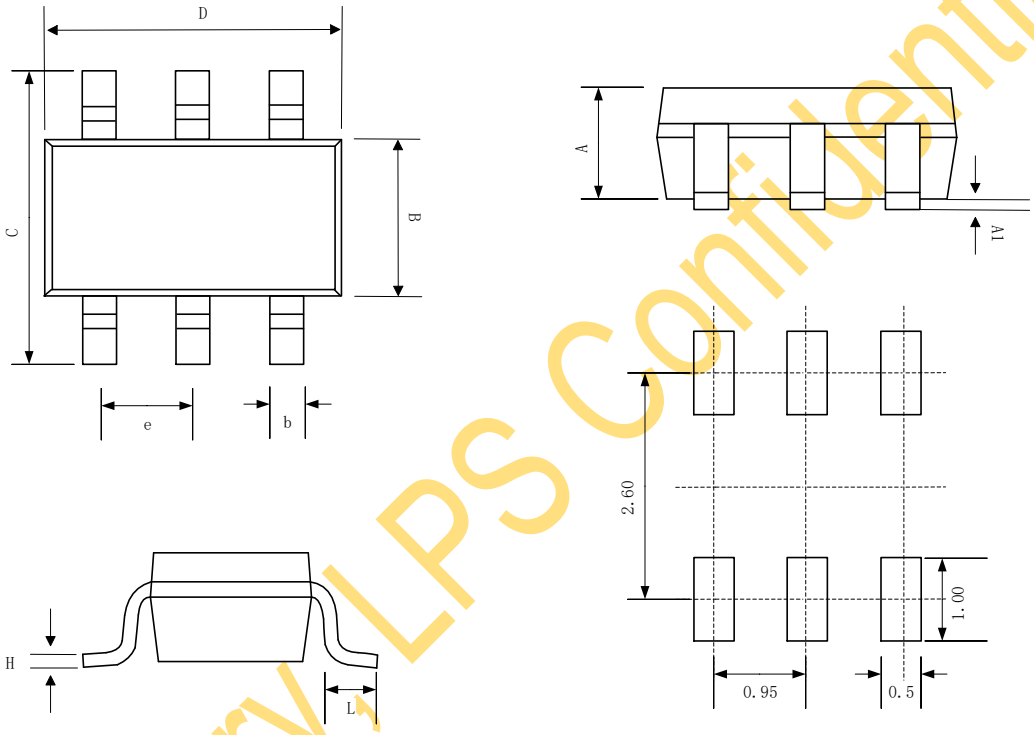
SOT23-6



Recommended Land Pattern

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.889	1.100	1.295
A1	0.000	0.050	0.152
B	1.397	1.600	1.803
b	0.28	0.35	0.559
C	2.591	2.800	3.000
D	2.692	2.920	3.120
e	0.95BSC		
H	0.080	0.152	0.254
L	0.300	0.450	0.610

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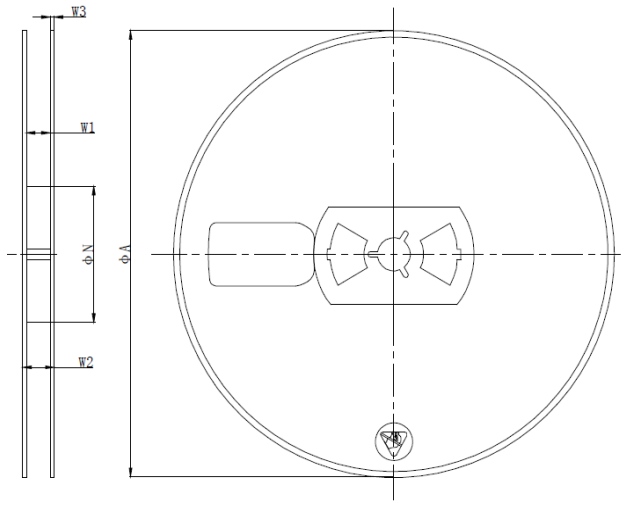
Tape and Reel Information

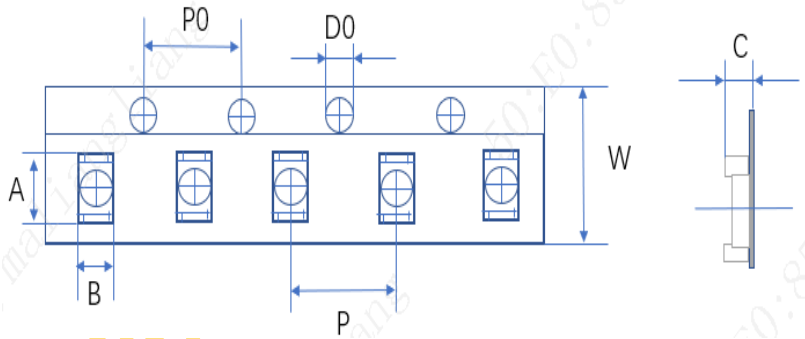
SOP8

REEL DIMENSIONS



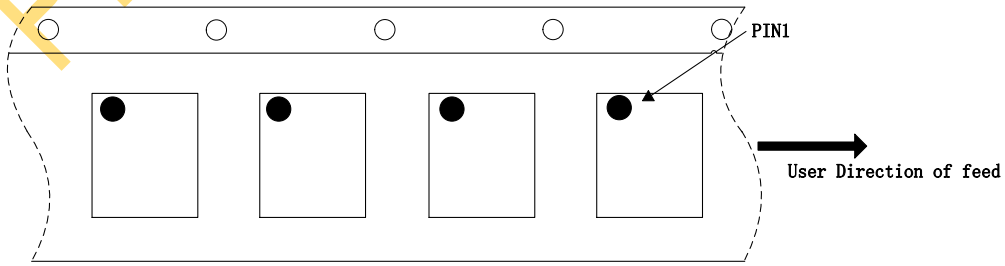
SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
ΦA	325.00	329.00	333.00
W2	15.00	17.00	19.00

TAPE DIMENSIONS



SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
A	6.20	6.60	7.00
B	5.10	5.50	5.90
P0	3.80	4.00	4.20
P	7.80	8.00	8.20
D0	1.30	1.50	1.70
W	11.90	12.00	12.30
C	1.90	2.10	2.30

PIN1 AND TAPE FEEDING DIRECTION



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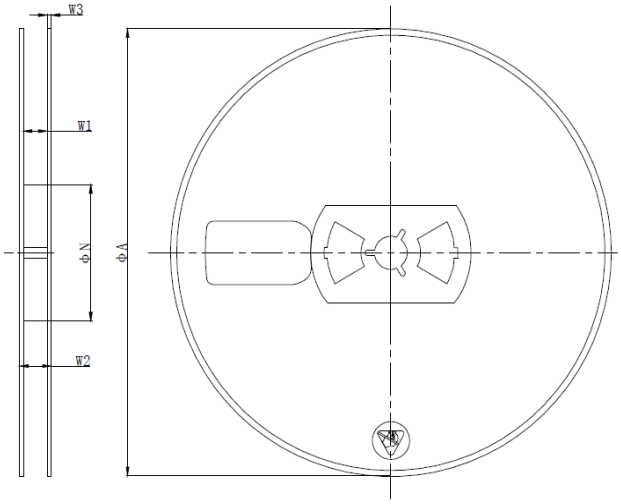
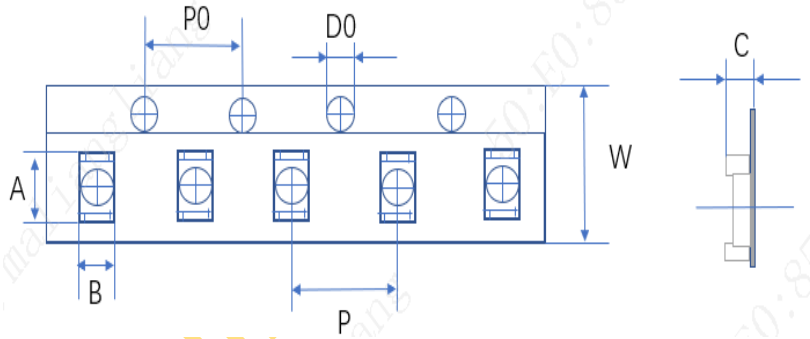
REEL DIMENSIONS



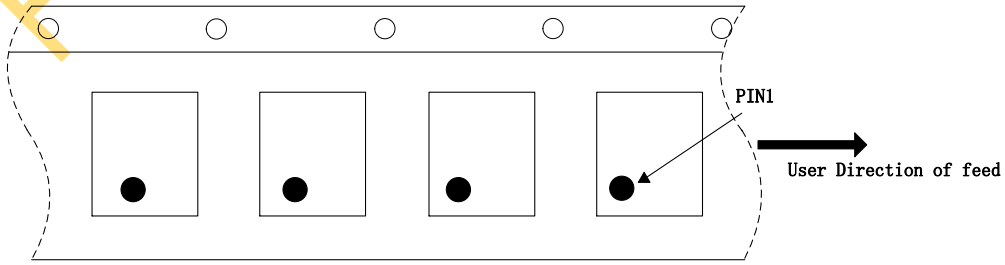
SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
ΦA	176.00	180.00	184.00
W2	10.00	12.00	14.00

TAPE DIMENSIONS



SYMBOL	Dimensions In Millimeters		
	MIN	NOM	MAX
A	3.00	3.20	3.40
B	3.06	3.26	3.46
P0	3.90	4.00	4.10
P	3.90	4.00	4.10
D0	1.35	1.50	1.65
W	7.70	8.00	8.30
C	1.20	1.40	1.60

PIN1 AND TAPE FEEDING DIRECTION



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Classification of IR Reflow Profile

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat/Soak Temperature Min(T_{SMIN}) Temperature Max(T_{SMAX}) Time(T_S) from (T_{SMIN} to T_{SMAX})	 100℃ 150℃ 60~120 seconds	 150℃ 200℃ 60~120 seconds
Ramp-up rate (T_L to T_P)	3℃/second max	3℃/second max
Liquidous temperature(T_L) Time(t_L) maintained above T_L	183℃ 60~150 seconds	217℃ 60~150 seconds
Peak package body temperature (T_P)	For users T_P must not exceed the Classification temp in Table 1. For suppliers T_P must equal or exceed the Classification temp in Table 1.	For users T_P must not exceed the Classification temp in Table 2. For suppliers T_P must equal or exceed the Classification temp in Table 2.
Time(t_P)* within 5℃ of the specified classification temperature(T_C), see Figure1	20* seconds	30* seconds
Ramp-down rate (T_P to T_L)	6℃/second max	6℃/second max
Time 25℃ to peak temperature	6 minutes max	8minutes max
* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.		

Table 1Sn-Pb Eutectic Process - Classification Temperatures (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ ≥350
<2.5mm	235℃	220℃
≥2.5mm	220℃	220℃

Table 2 Pb-Free Process - Classification Temperatures (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ 350~2000	Volume mm³ ≥350
<1.6mm	260℃	260℃	260℃
1.6mm~2.5mm	260℃	250℃	245℃
>2.5mm	250℃	245℃	245℃

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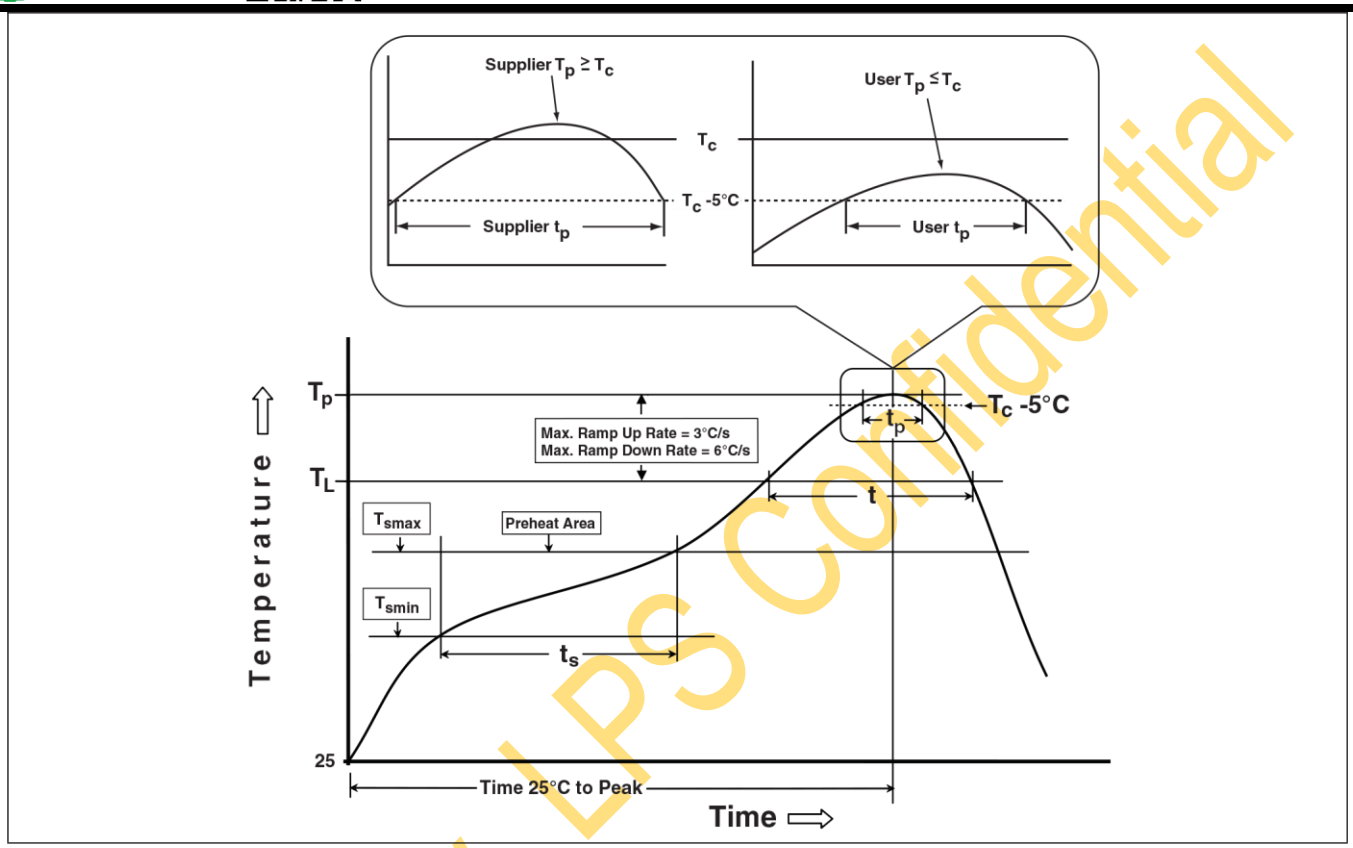

Figure1Classification Profile (Not to scale)

Products conform to "JEDEC J-STD-020C" standards;

Products shipped conform to "Rohs" standards;

Moisture Sensitivity Level：MSL3（CONDITION：≦30 °C/60%RH、Time control:168 hours）;

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