

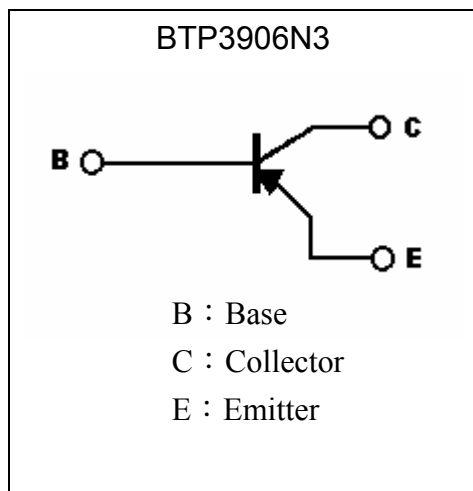
**General Purpose PNP Epitaxial Planar Transistor**

# BTP3906N3

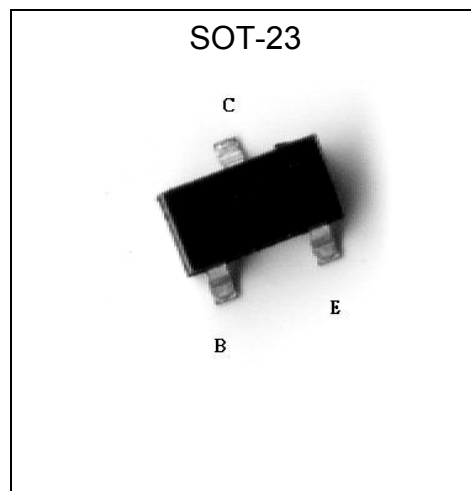
## Description

- Complementary to BTN3904N3.
- Pb-free lead plating and halogen-free package

## Symbol

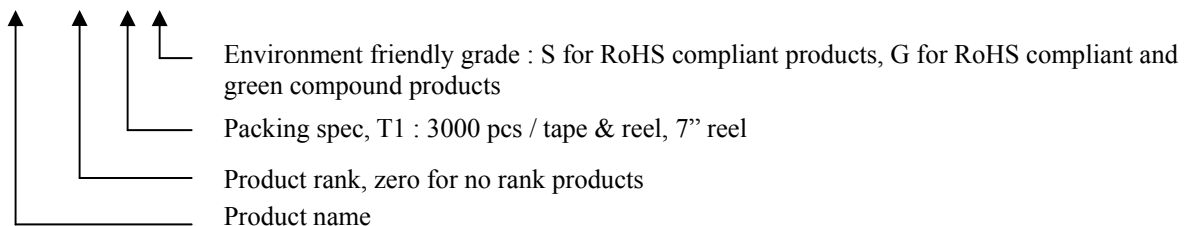


## Outline



## Ordering Information

Device	Package	Shipping
BTP3906N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel





**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-40	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5	V
Collector Current	I <sub>C</sub>	-200	mA
Power Dissipation (T <sub>A</sub> =25°C)	P <sub>D</sub>	225 (Note)	mW
Power Dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	560	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

**Thermal Characteristics**

Symbol	Parameter	Conditions	Value	Unit
R <sub>th,j-c</sub>	thermal resistance from junction to case		223	°C/W
R <sub>th, j-a</sub>	thermal resistance from junction to ambient	(Note )	556	°C/W

Note : Free air condition

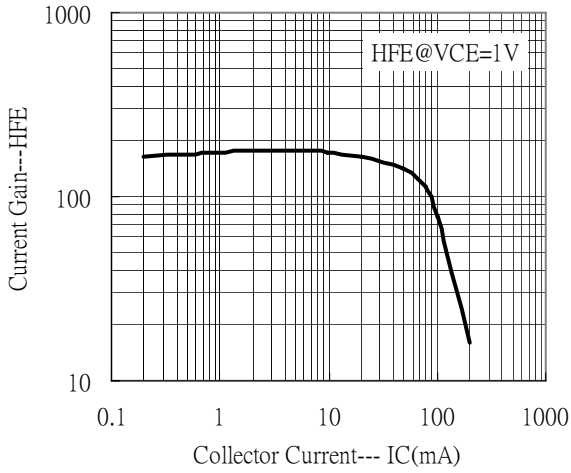
**Characteristics** (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CB0</sub>	-40	-	-	V	I <sub>C</sub> =-10μA
BV <sub>CEO</sub>	-40	-	-	V	I <sub>C</sub> =-1mA
BV <sub>EBO</sub>	-5	-	-	V	I <sub>E</sub> =-10μA
I <sub>CEX</sub>	-	-	-50	nA	V <sub>CE</sub> =-30V, V <sub>BE</sub> =3V
I <sub>EBO</sub>	-	-	-50	nA	V <sub>EB</sub> =-4V
*V <sub>CE(sat)</sub>	-	-0.05	-0.25	V	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA
*V <sub>CE(sat)</sub>	-	-0.12	-0.4	V	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA
*V <sub>BE(sat)</sub>	-0.65	-0.76	-0.85	V	I <sub>C</sub> =-10mA, I <sub>B</sub> =-1mA
*V <sub>BE(sat)</sub>	-	-0.88	-0.95	V	I <sub>C</sub> =-50mA, I <sub>B</sub> =-5mA
*h <sub>FE</sub>	60	-	-		V <sub>CE</sub> =-1V, I <sub>C</sub> =-100μA
*h <sub>FE</sub>	80	-	-		V <sub>CE</sub> =-1V, I <sub>C</sub> =-1mA
*h <sub>FE</sub>	100	-	300		V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA
*h <sub>FE</sub>	60	-	-		V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA
*h <sub>FE</sub>	30	-	-		V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA
f <sub>T</sub>	250	-	-	MHz	V <sub>CE</sub> =-20V, I <sub>C</sub> =-10mA, f=100MHz
C <sub>ob</sub>	-	-	4.5	pF	V <sub>CB</sub> =-5V, I <sub>E</sub> =0A, f=1MHz

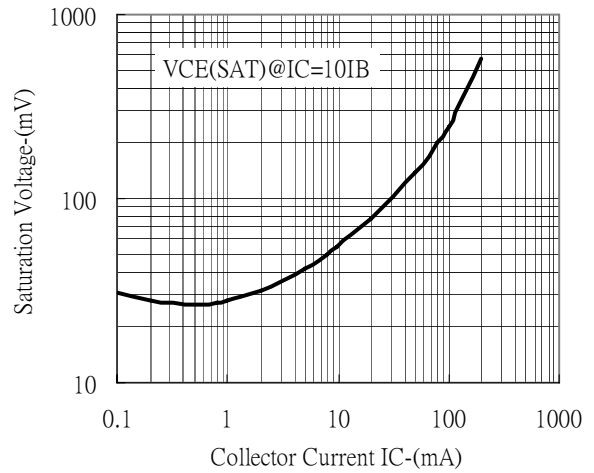
\*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

**Characteristic Curves**

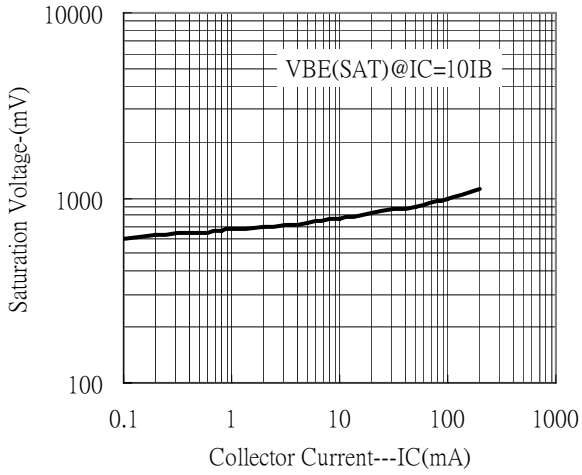
Current Gain vs Collector Current



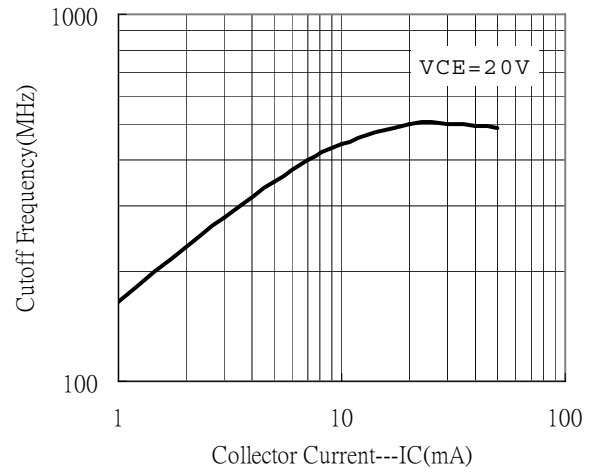
Saturation Voltage vs Collector Current



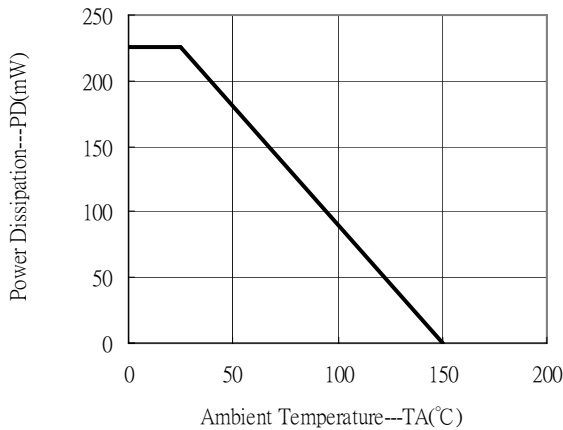
Saturation Voltage vs Collector Current



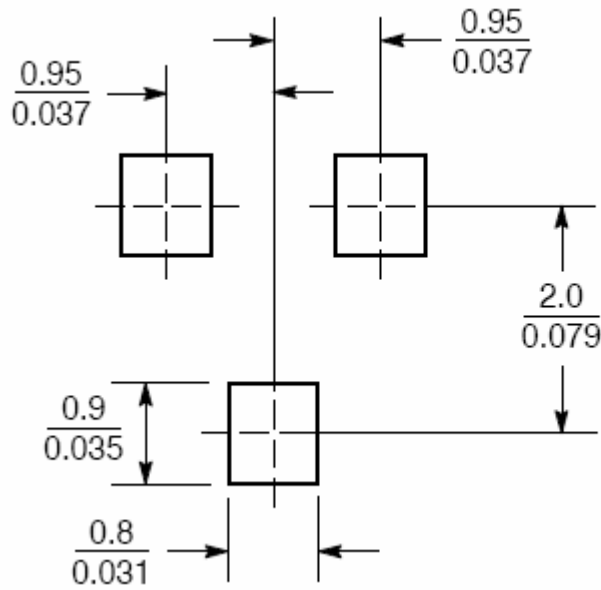
Cutoff Frequency vs Collector Current



Power Derating Curve

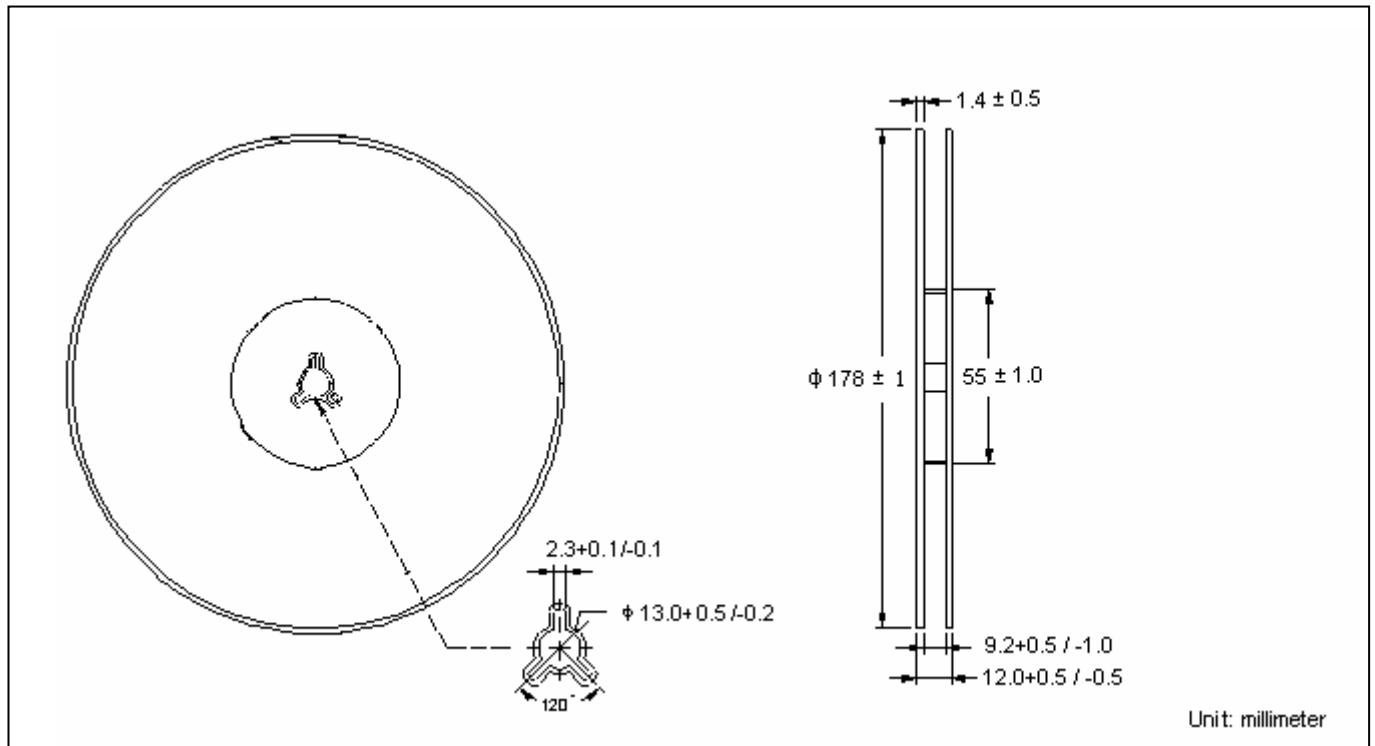


### Recommended Soldering Footprint

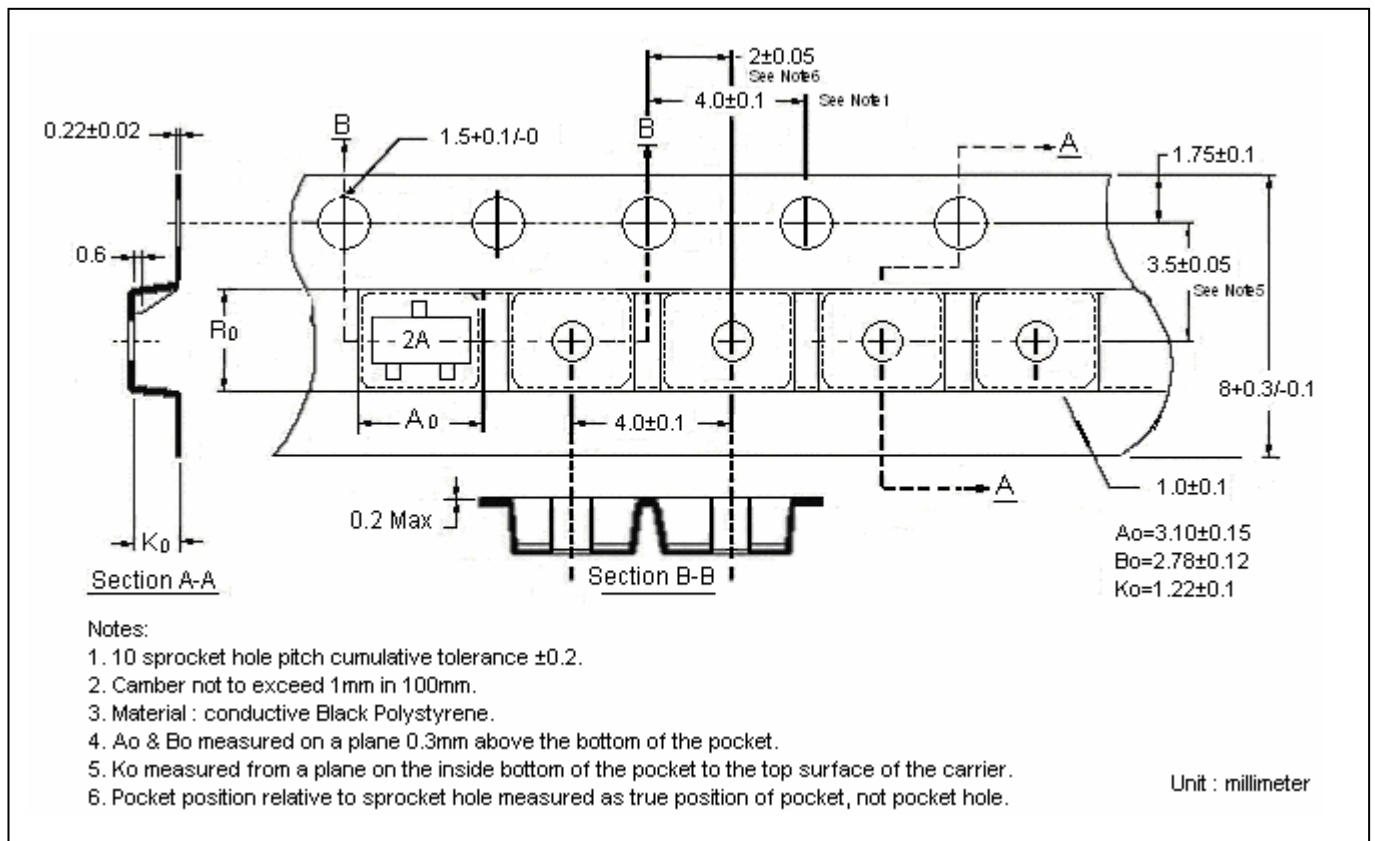


Unit :  $\frac{\text{mm}}{\text{inches}}$

**Reel Dimension**



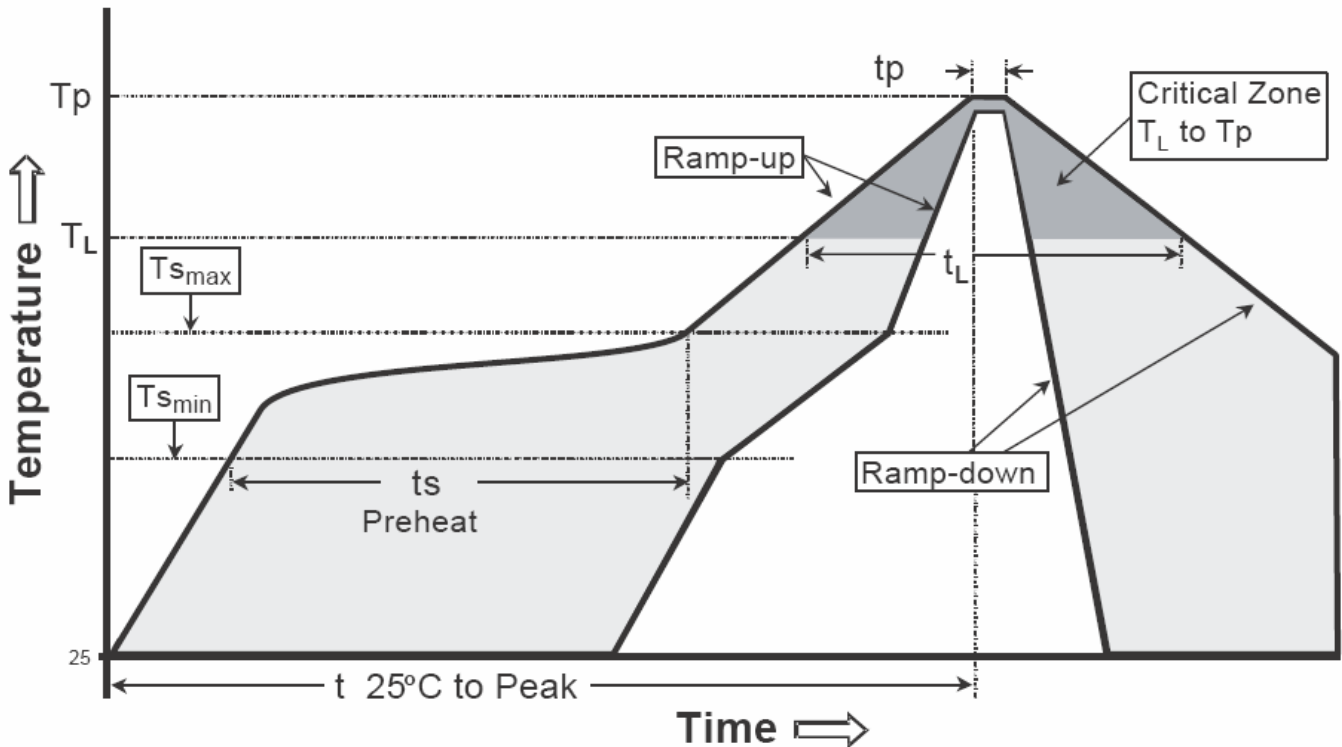
**Carrier Tape Dimension**



**Recommended wave soldering condition**

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

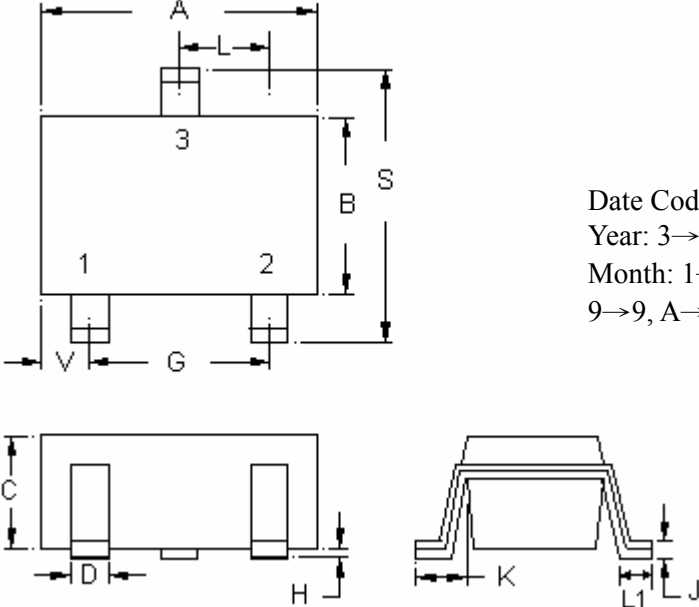
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

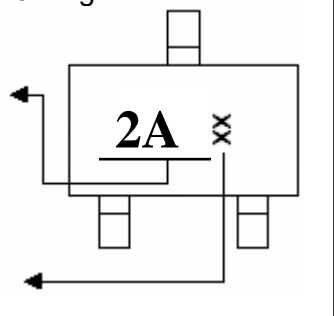
Note : All temperatures refer to topside of the package, measured on the package body surface.

**SOT-23 Dimension**



The diagram shows three views of the SOT-23 package: a top view with dimensions A, B, C, G, H, L, S, V; a side view with dimensions C, D, H; and a perspective view with dimensions K, L1, L, J. The top view also labels pins 1, 2, and 3.

Marking:



Product Code

Date Code: Year+Month  
 Year: 3→2003, 4→2004  
 Month: 1→1, 2→2, . . .  
 9→9, A→10, B→11, C→12

3-Lead SOT-23 Plastic  
 Surface Mounted Package  
 CYStek Package Code: N3

Style : Pin 1.Base 2.Emitter 3.Collector

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

Notes: 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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