

**General Purpose NPN Epitaxial Planar Transistor**

# BTC3906N3

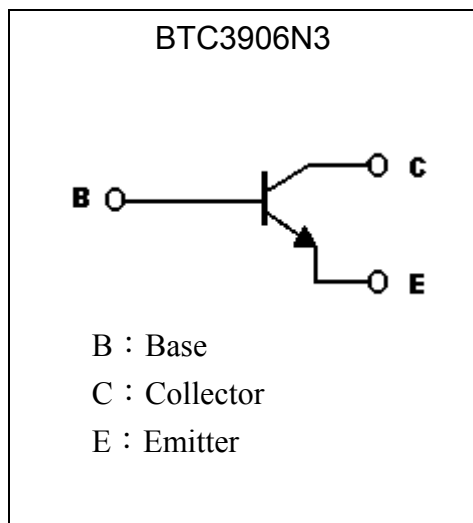
## Description

The BTC3906N3 is designed for general purpose applications requiring high breakdown voltage.

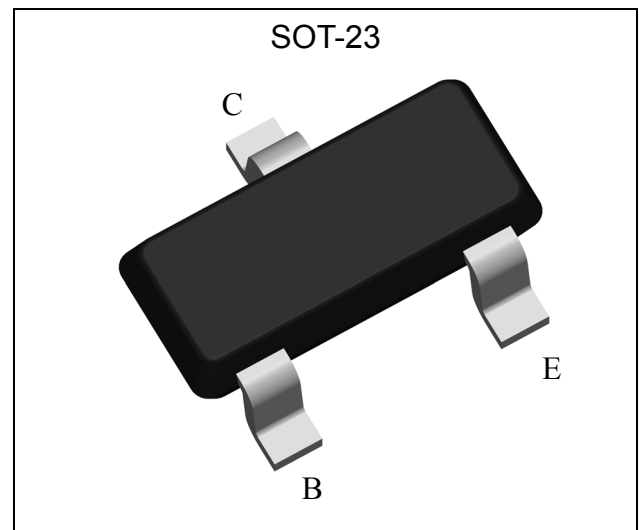
## Features

- High collector-emitter breakdown voltage. ( $BV_{CEO}=160V @ I_C=1mA$ )
- Complement to BTA1514N3
- Pb-free and Halogen-free package

## Symbol

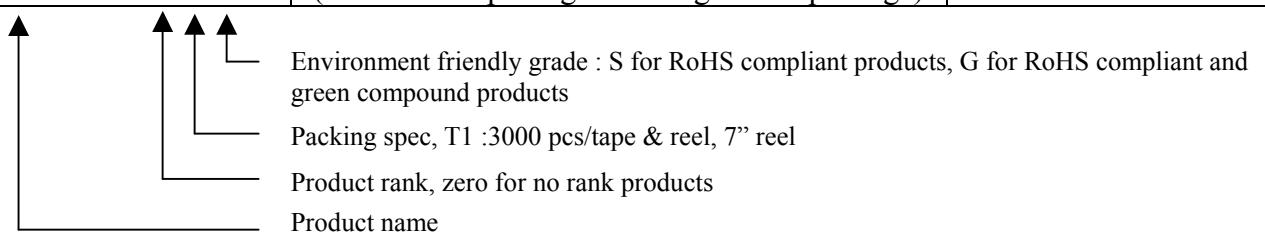


## Outline



## Ordering Information

Device	Package	Shipping
BTC3906N3-X-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>	180	V
Collector-Emitter Voltage	V <sub>CEO</sub>	160	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Collector Current	I <sub>C</sub>	600	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
Thermal Resistance, Junction to Ambient (Note )	R <sub>θJA</sub>	556 (Note)	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	223	°C/W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

Note : Free air condition.

**Characteristics** (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CB0</sub>	180	-	-	V	I <sub>C</sub> =100μA
BV <sub>CEO</sub>	160	-	-	V	I <sub>C</sub> =1mA
BV <sub>EBO</sub>	6	-	-	V	I <sub>E</sub> =10μA
I <sub>CB0</sub>	-	-	50	nA	V <sub>CB</sub> =120V
I <sub>EBO</sub>	-	-	50	nA	V <sub>EB</sub> =4V
*V <sub>CE(sat)1</sub>	-	0.1	0.15	V	I <sub>C</sub> =10mA, I <sub>B</sub> =1mA
*V <sub>CE(sat)2</sub>	-	-	0.2	V	I <sub>C</sub> =50mA, I <sub>B</sub> =5mA
*V <sub>BE(sat)1</sub>	-	-	1	V	I <sub>C</sub> =10mA, I <sub>B</sub> =1mA
*V <sub>BE(sat)2</sub>	-	-	1	V	I <sub>C</sub> =50mA, I <sub>B</sub> =5mA
*h <sub>FE1</sub>	100	-	-	-	V <sub>CE</sub> =5V, I <sub>C</sub> =1mA
*h <sub>FE2</sub>	100	-	-	-	V <sub>CE</sub> =5V, I <sub>C</sub> =10mA
*h <sub>FE3</sub>	50	-	-	-	V <sub>CE</sub> =5V, I <sub>C</sub> =50mA
*h <sub>FE4</sub>	120	-	390	-	V <sub>CE</sub> =6V, I <sub>C</sub> =2mA
f <sub>T</sub>	100	-	-	MHz	V <sub>CE</sub> =20V, I <sub>C</sub> =10mA, f=100MHz
C <sub>ob</sub>	-	-	6	pF	V <sub>CB</sub> =20V, I <sub>E</sub> =0A, f=1MHz

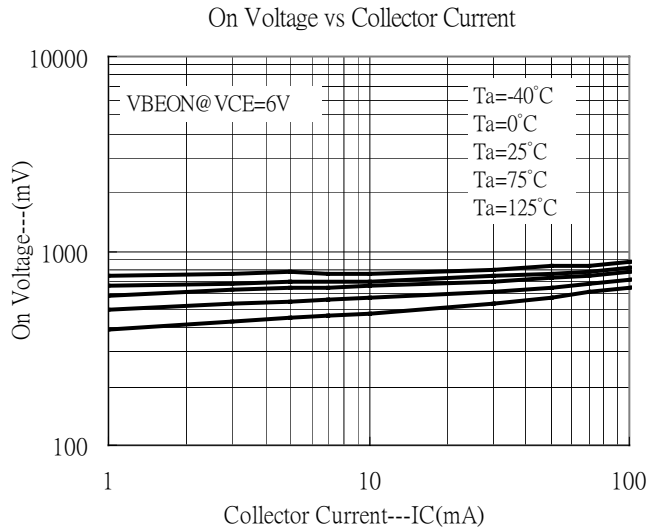
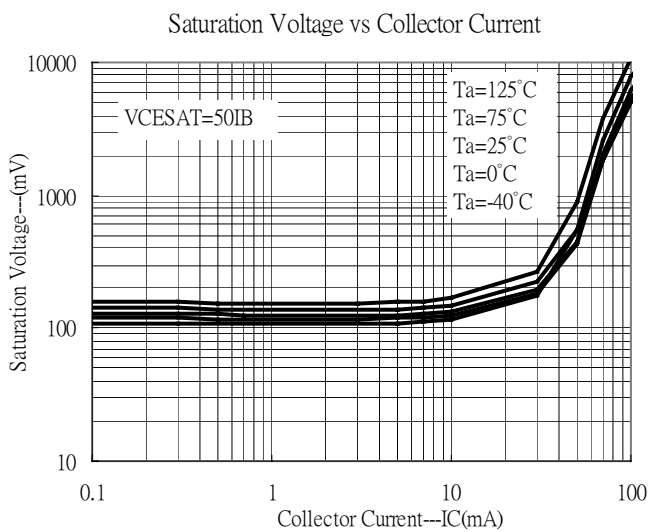
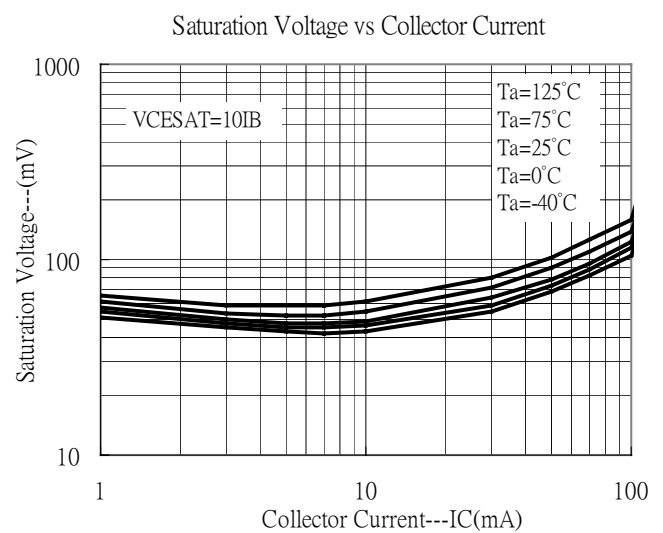
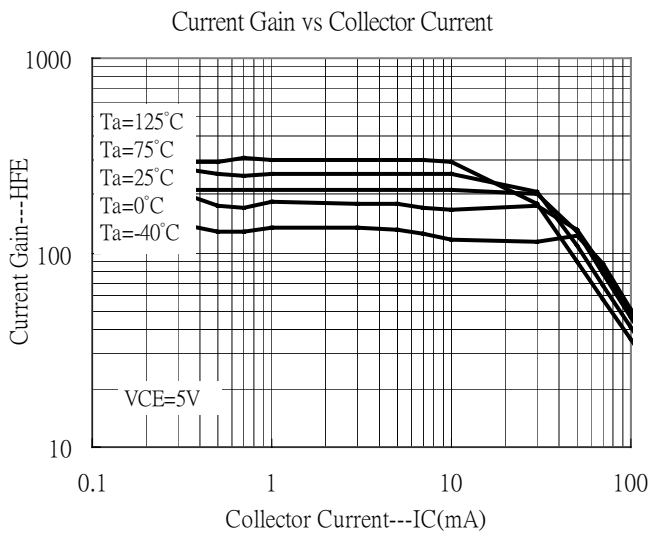
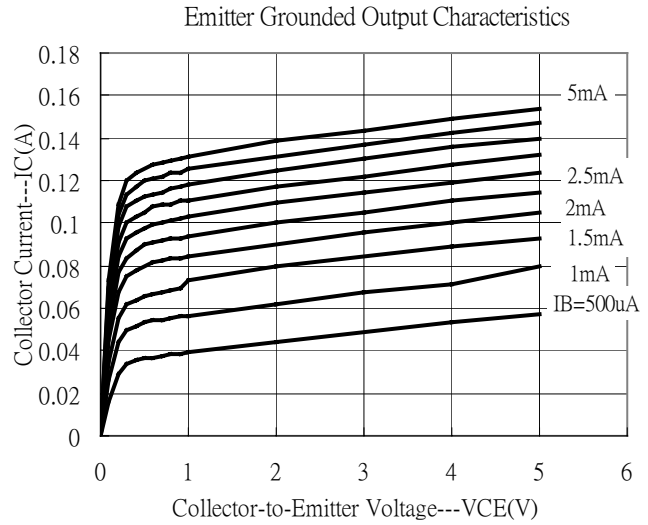
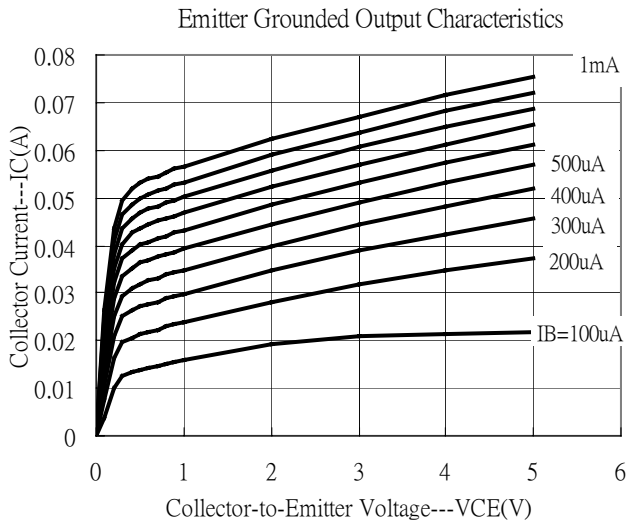
\*Pulse Test: Pulse Width ≤380us, Duty Cycles ≤2%

**Classification Of h<sub>FE</sub> 4**

Rank	Q	R
Range	120~270	180~390

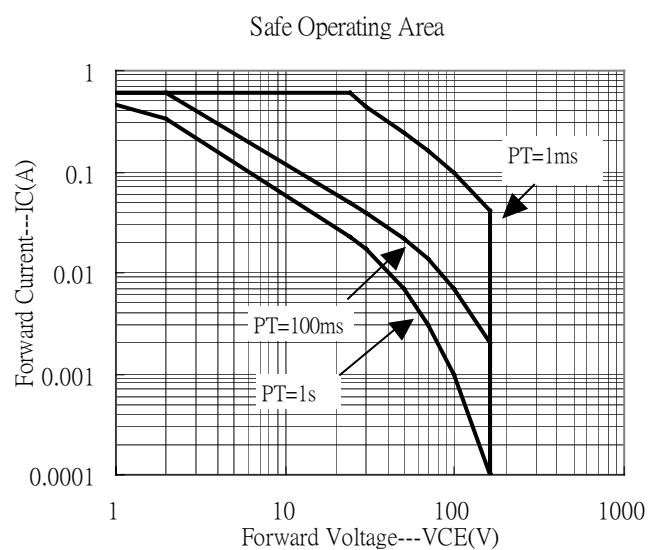
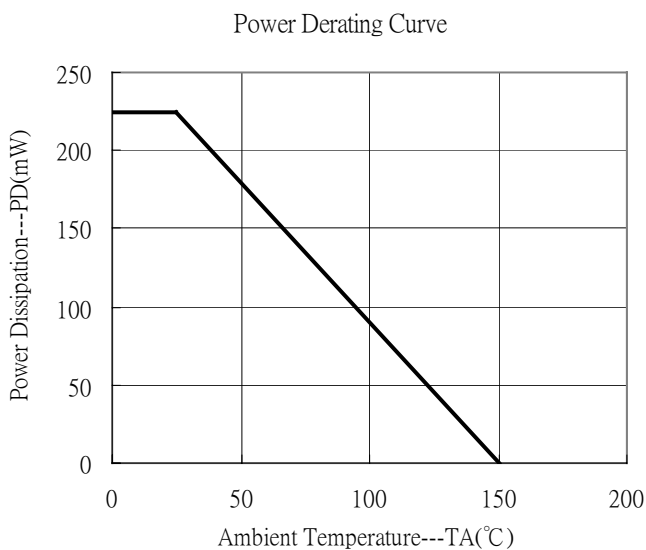
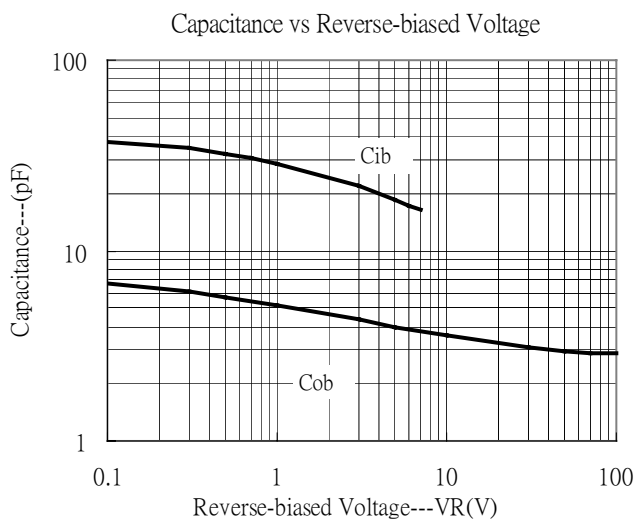
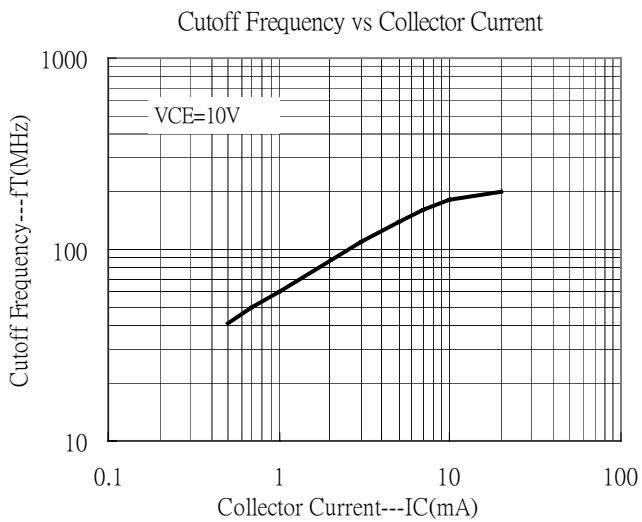
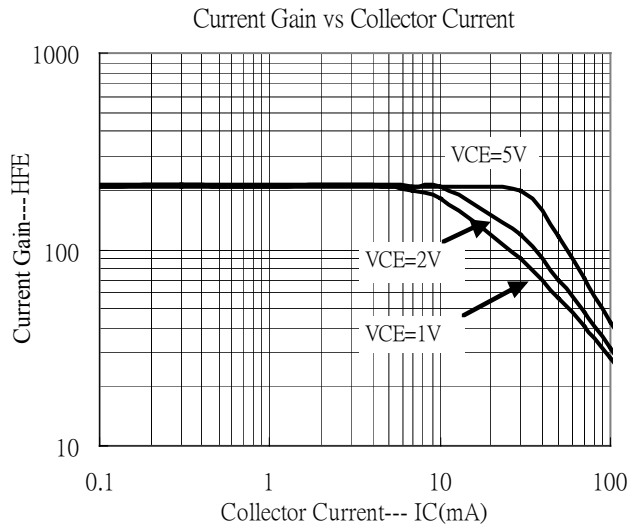
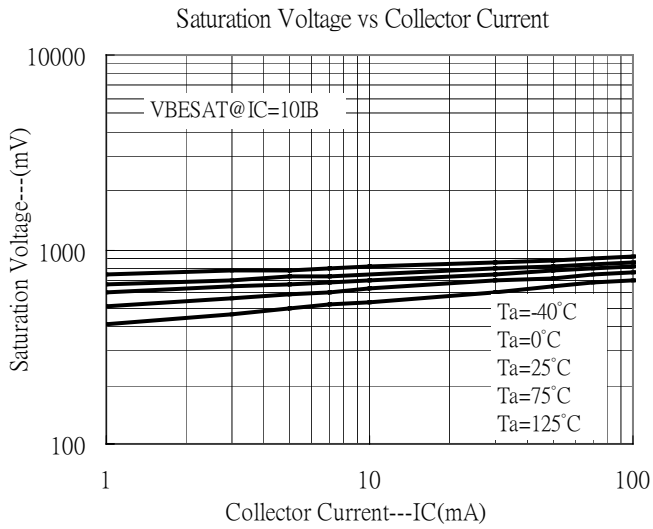


### Typical Characteristics

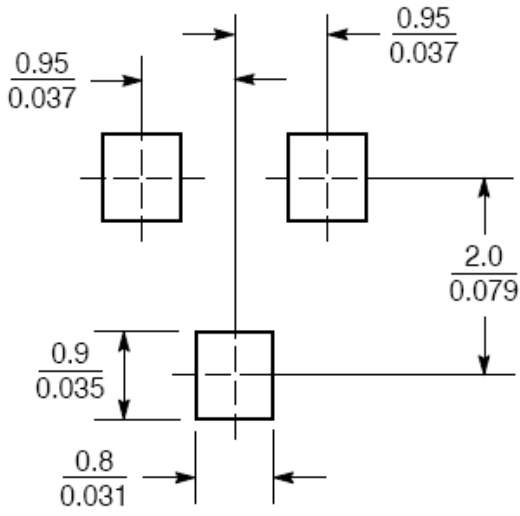




### Typical Characteristics(Cont.)

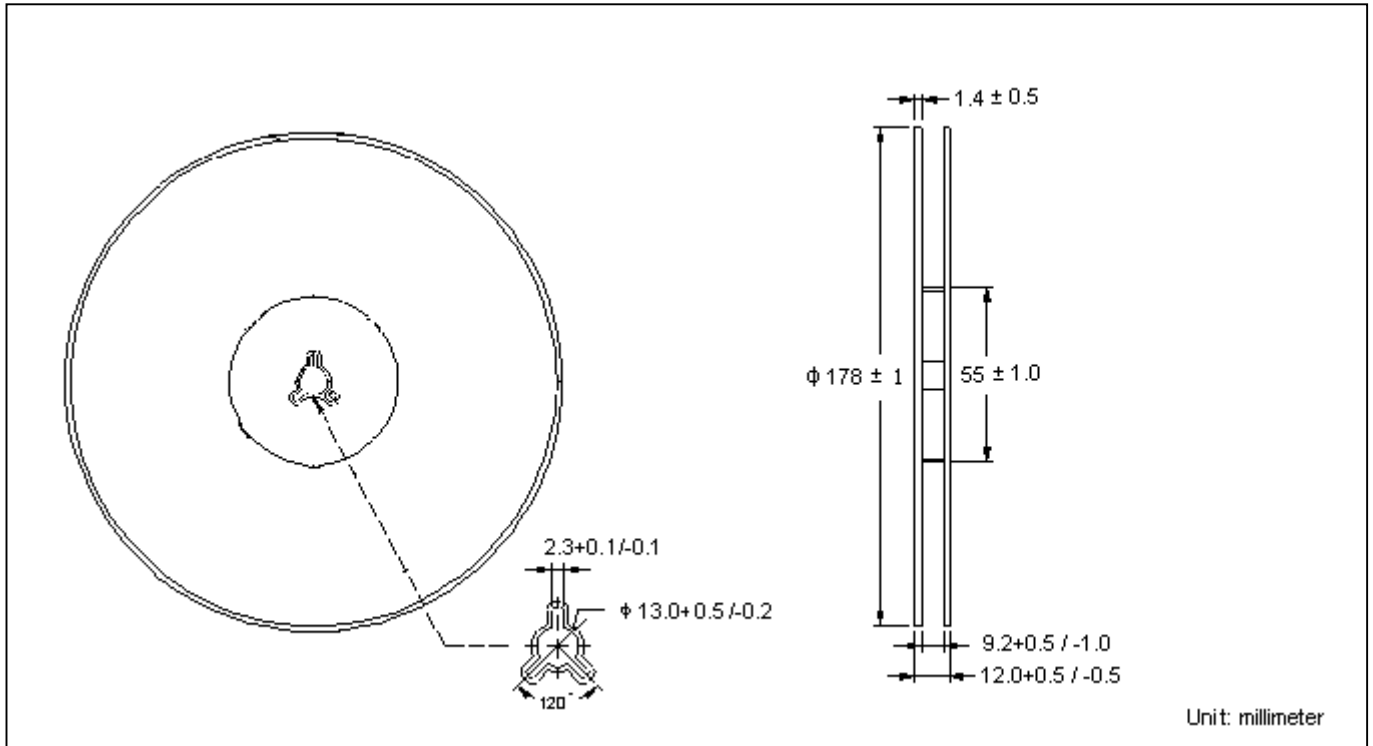


### Recommended Soldering Footprint

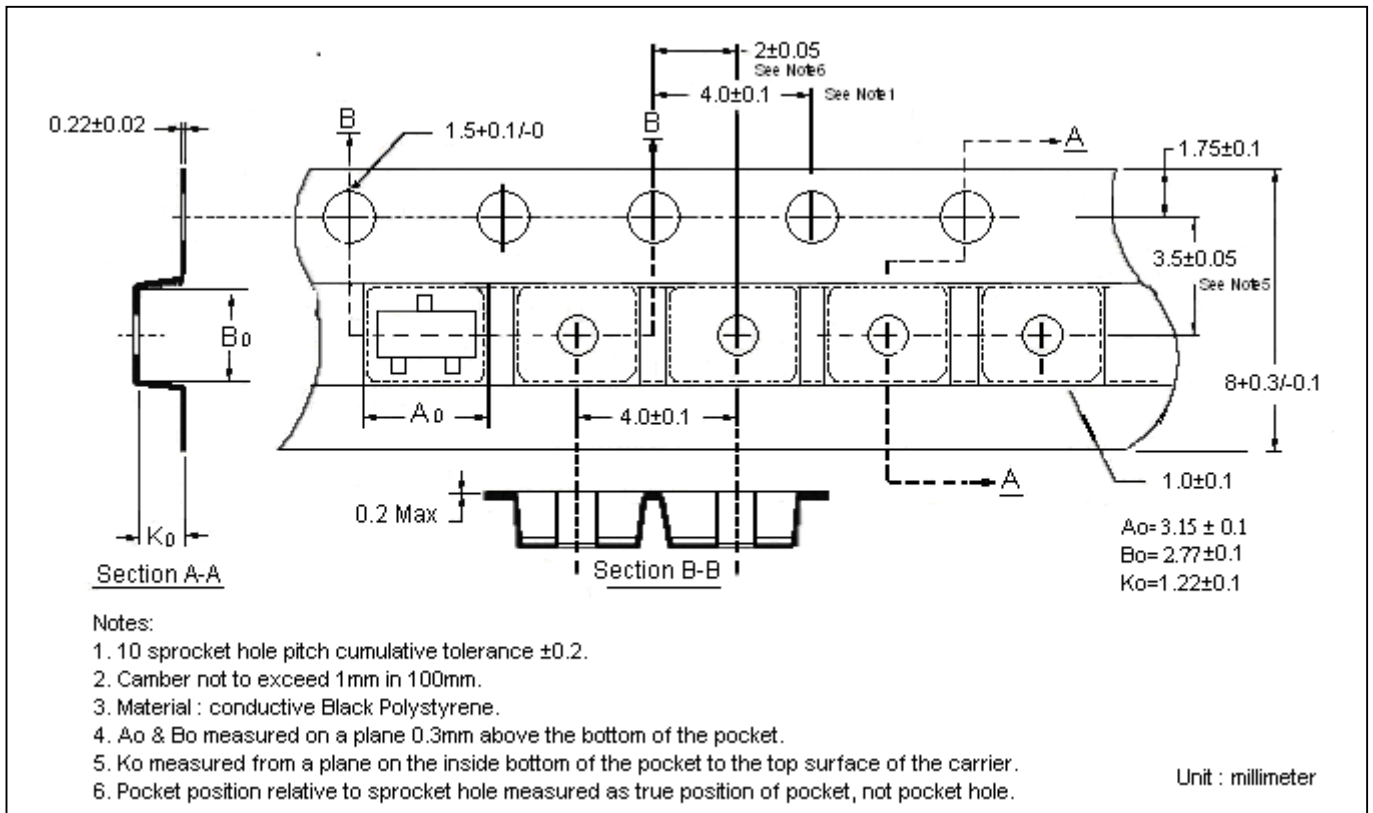


Unit :  $\frac{\text{mm}}{\text{inches}}$

**Reel Dimension**



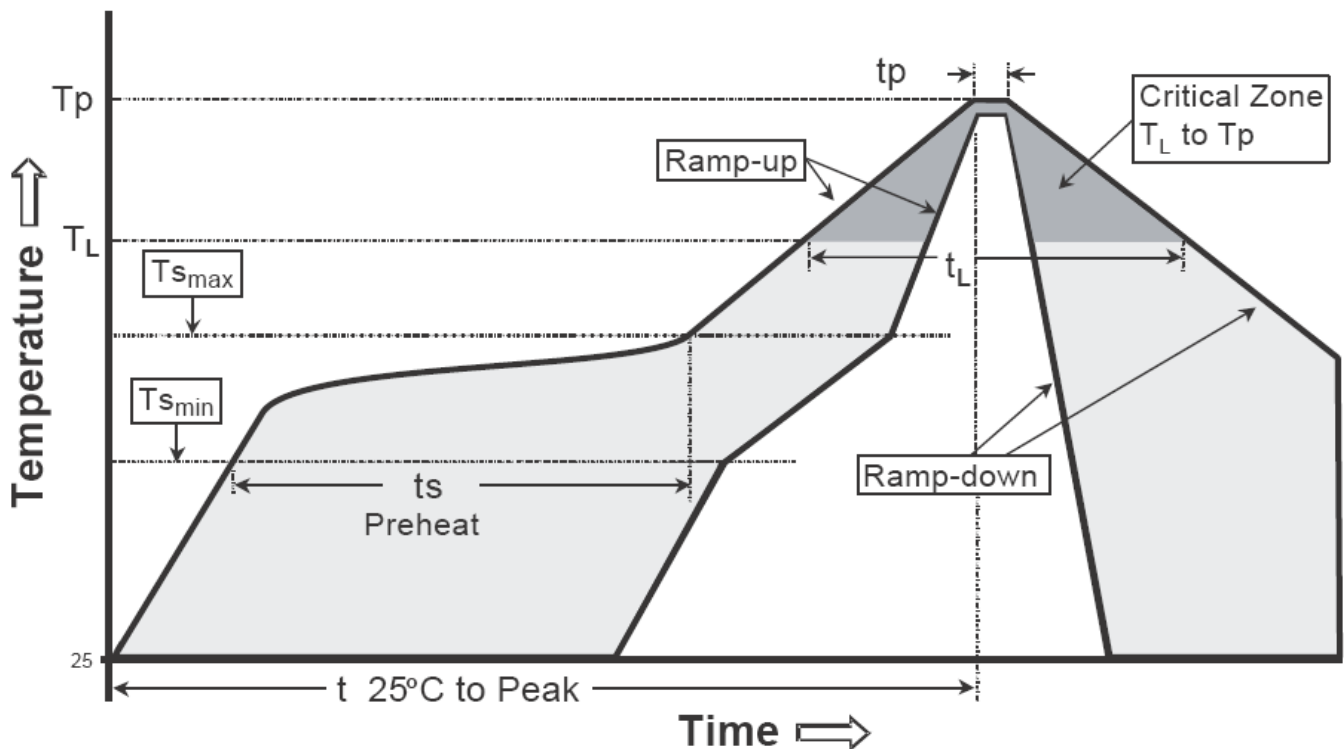
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

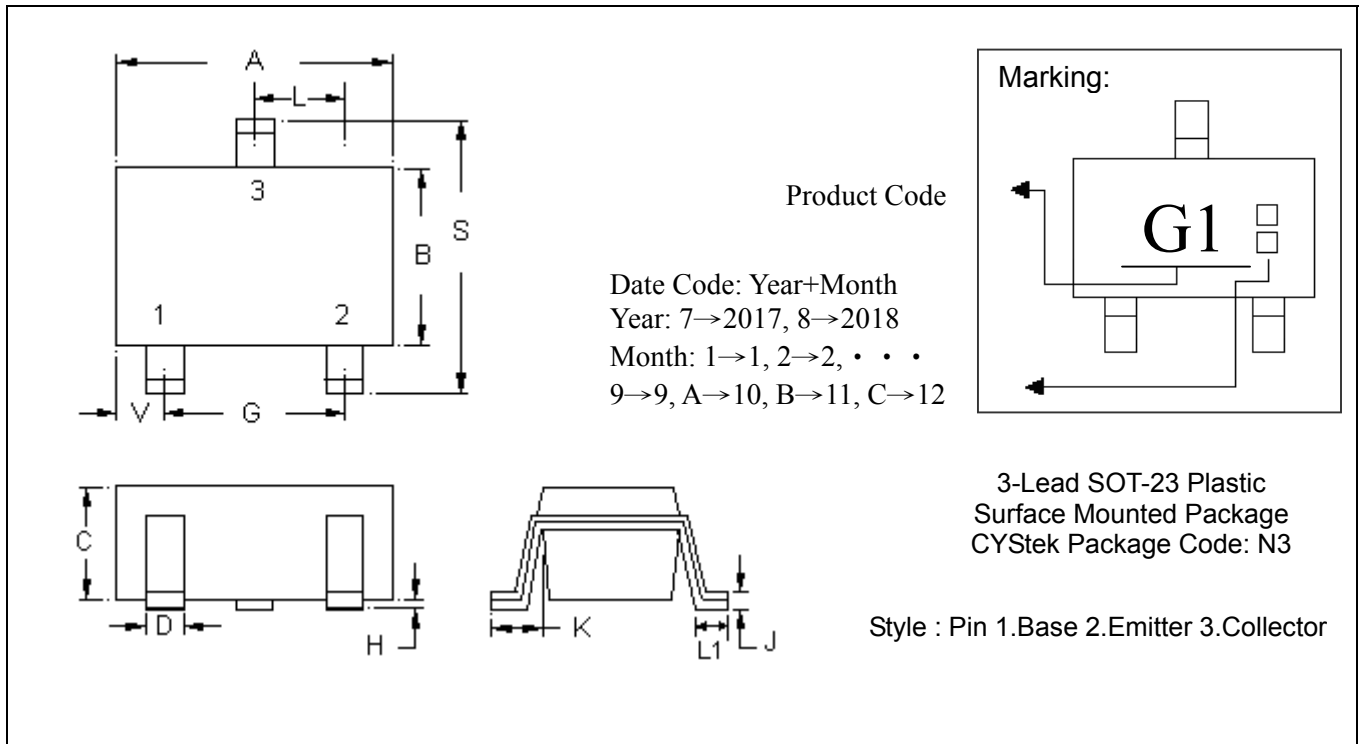
**Recommended temperature profile for IR reflow**



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**



\*:Typical

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	0.0551	1.20	1.40	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	0.1004	2.10	2.55
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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