

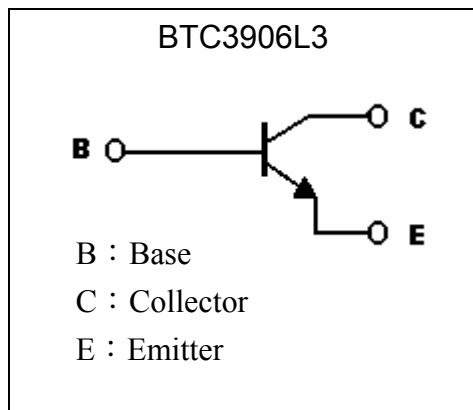
**General Purpose NPN Epitaxial Planar Transistor**

# BTC3906L3

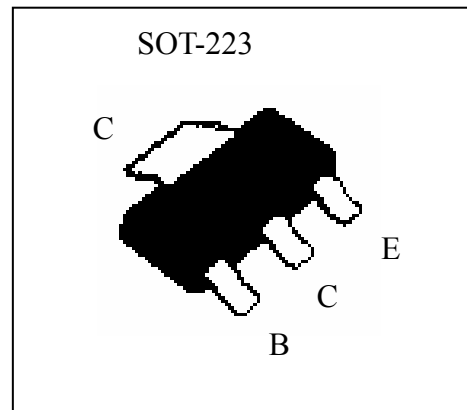
**Features**

- High collector-emitter breakdown voltage. ( $BV_{CEO}=160V @ I_C=1mA$ )
- Complement to BTA1514L3.
- Pb-free lead plating and halogen-free package.

**Symbol**

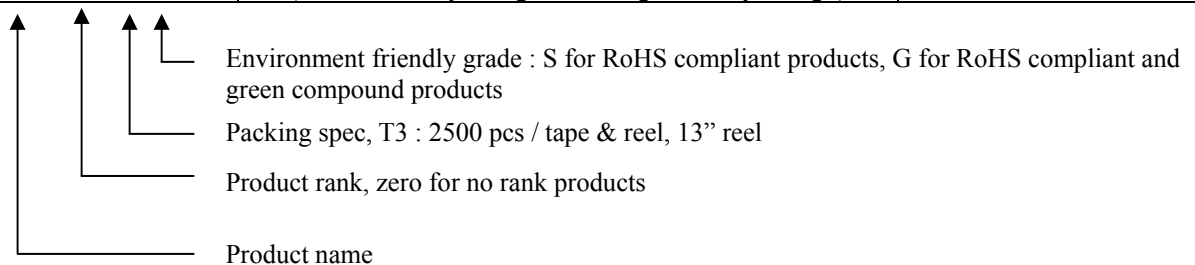


**Outline**



**Ordering Information**

Device	Package	Shipping
BTC3906L3-X-T3-G	SOT-223 (Pb-free lead plating and halogen-free package)	2500 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>	1.1 (Note 1)	W
Power Dissipation @ T <sub>A</sub> =25°C	P <sub>d</sub>	1.3 (Note 2)	W
Power Dissipation @ T <sub>C</sub> =25°C	P <sub>d</sub>	5	W
Operating Junction Temperature Range	T <sub>j</sub>	-55~+150	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+150	°C

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	R <sub>th,j-c</sub>	25	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 1)	R <sub>th,j-a</sub>	110	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	R <sub>th,j-a</sub>	95	°C/W

Note : 1. When the device is mounted on a FR-4 PCB, single sided copper, minimum mounting pad for collector.  
 2. When the device is mounted on a FR-4 PCB, single sided copper, mounting pad for collector of 1cm<sup>2</sup>.

**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
IC <sub>B0</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>	40	-	-	-	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

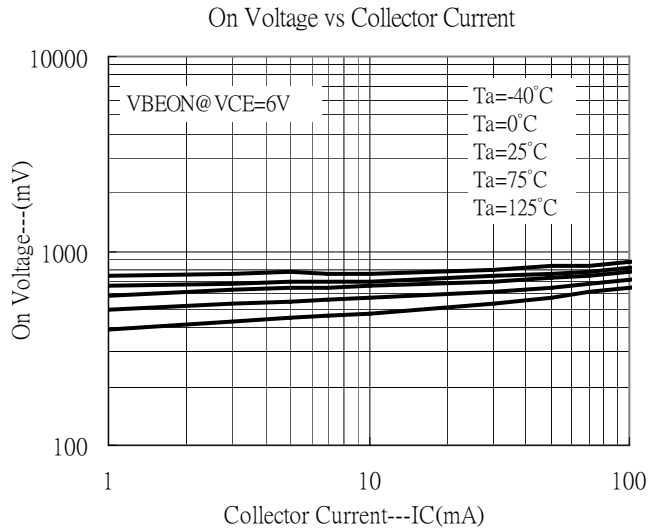
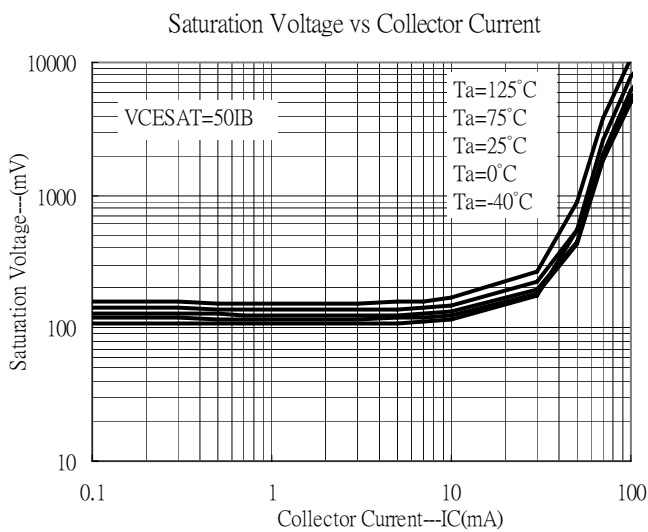
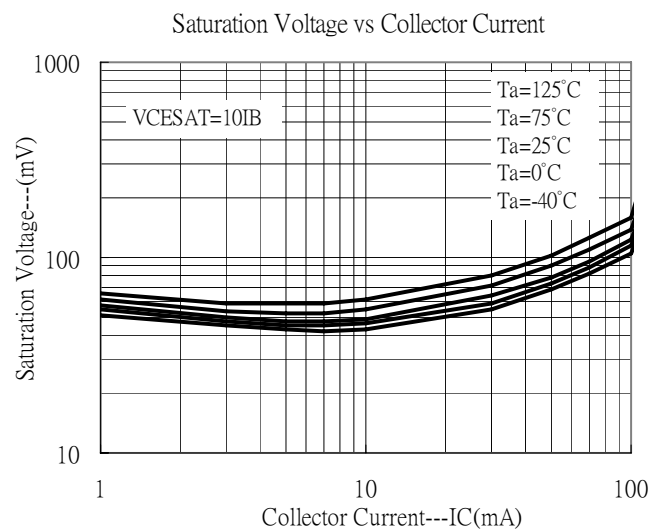
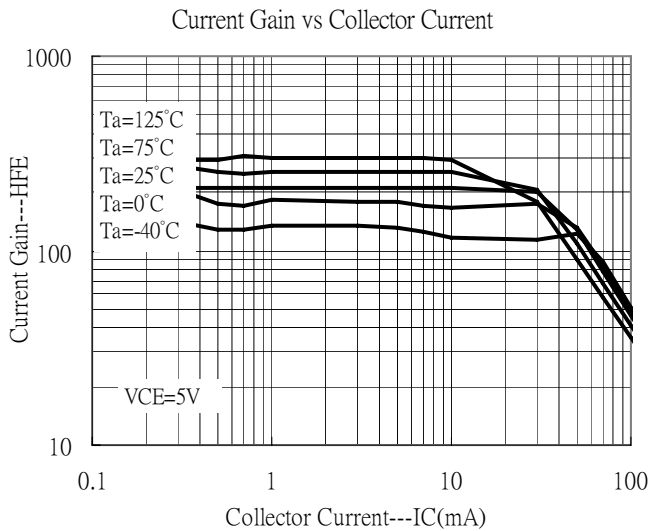
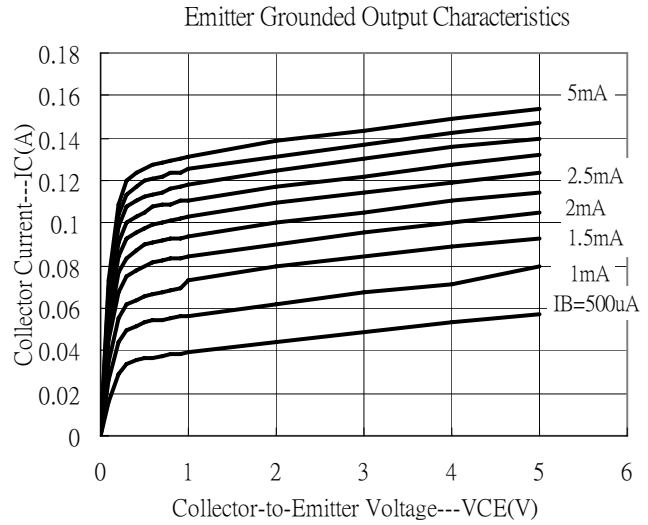
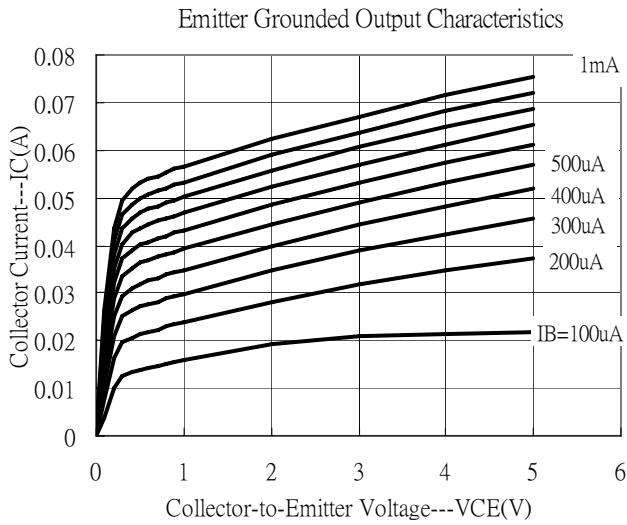
\*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

**Classification Of hFE 4**

Rank	Q	R
Range	120~270	180~390

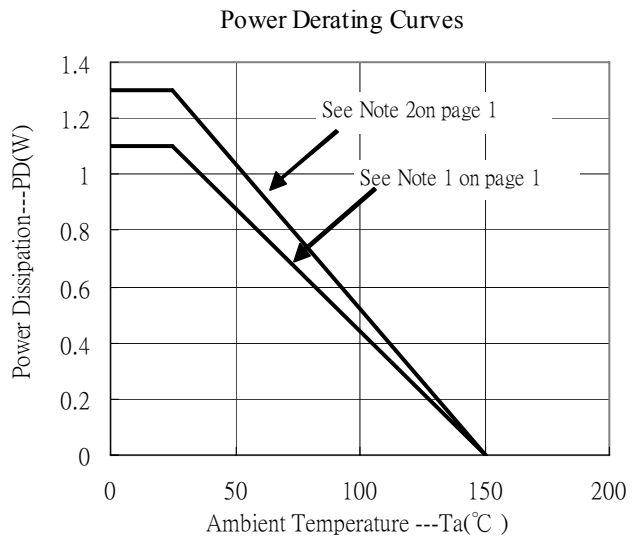
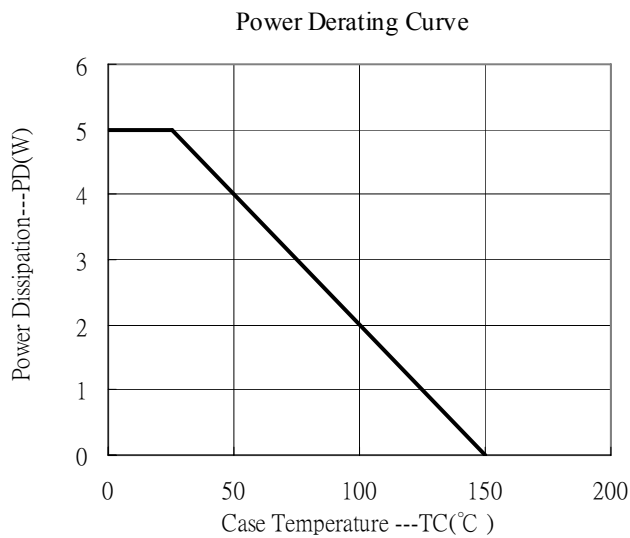
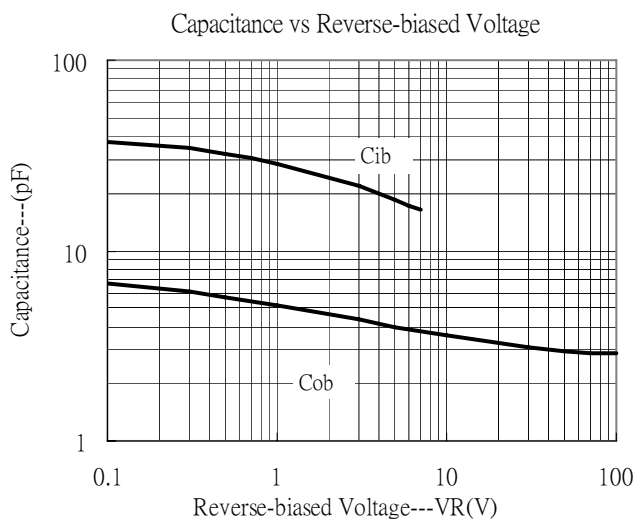
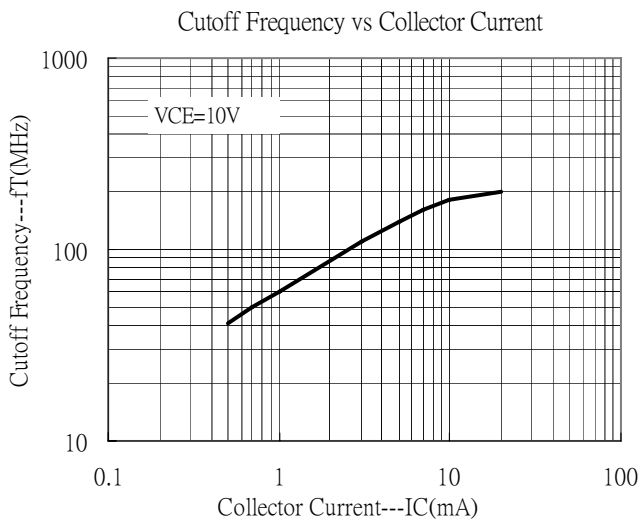
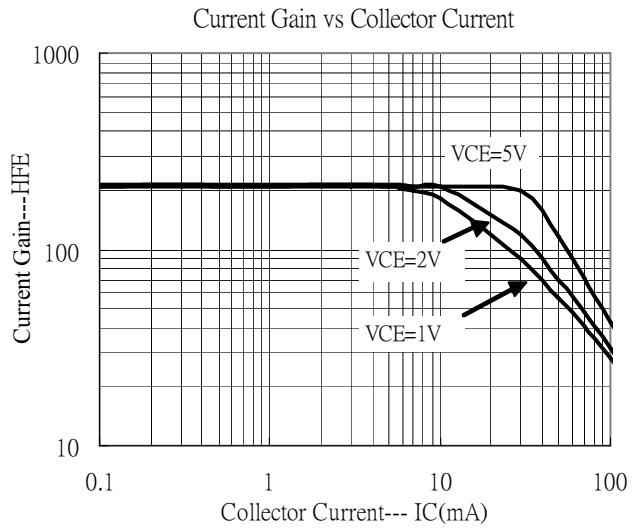
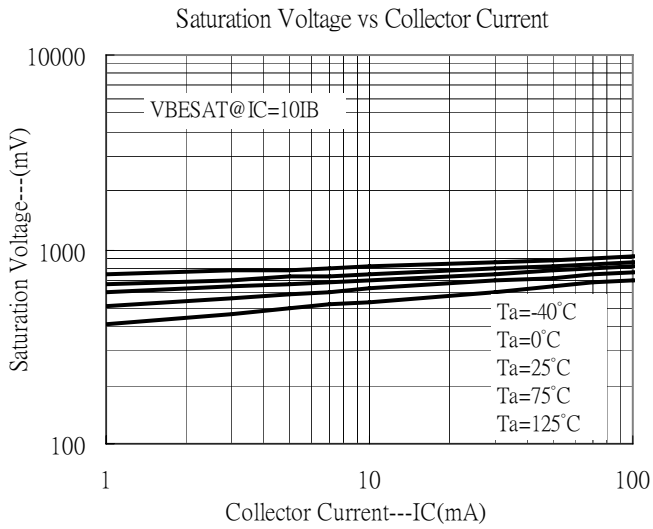


### Typical Characteristics

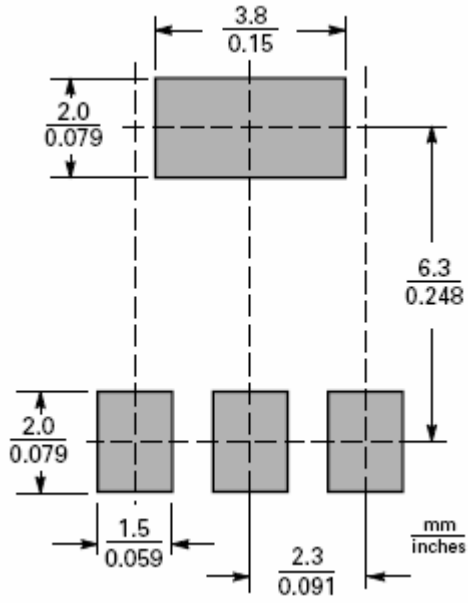




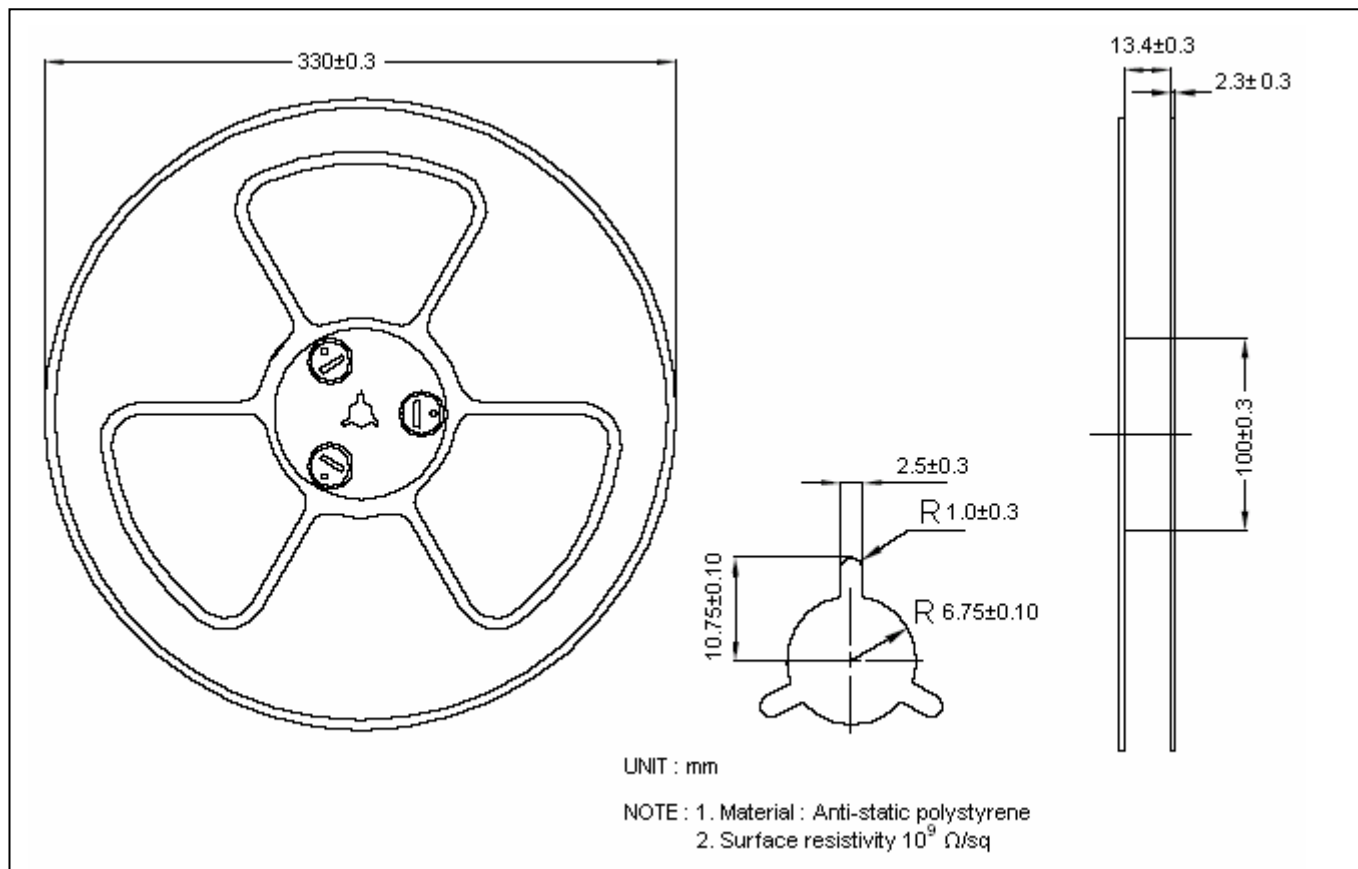
**Typical Characteristics(Cont.)**



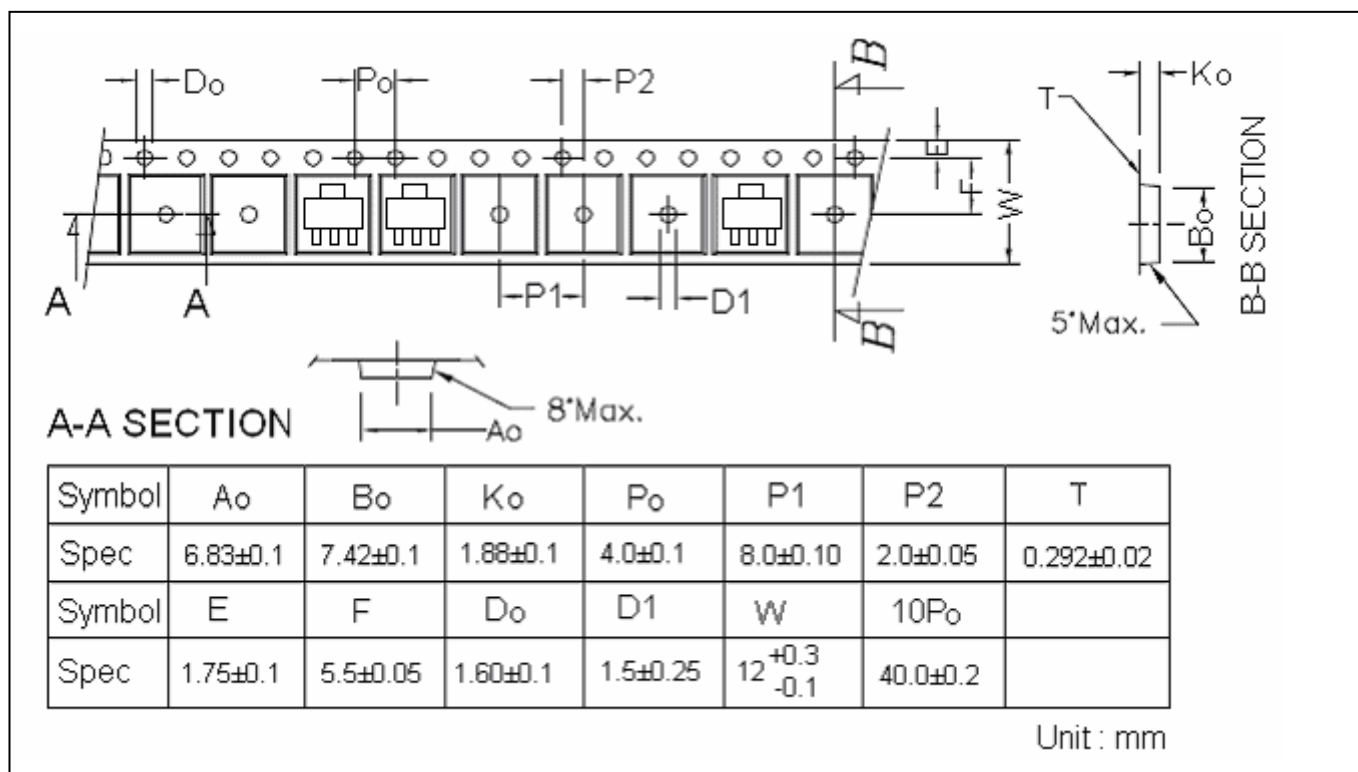
### Recommended soldering footprint



**Reel Dimension**



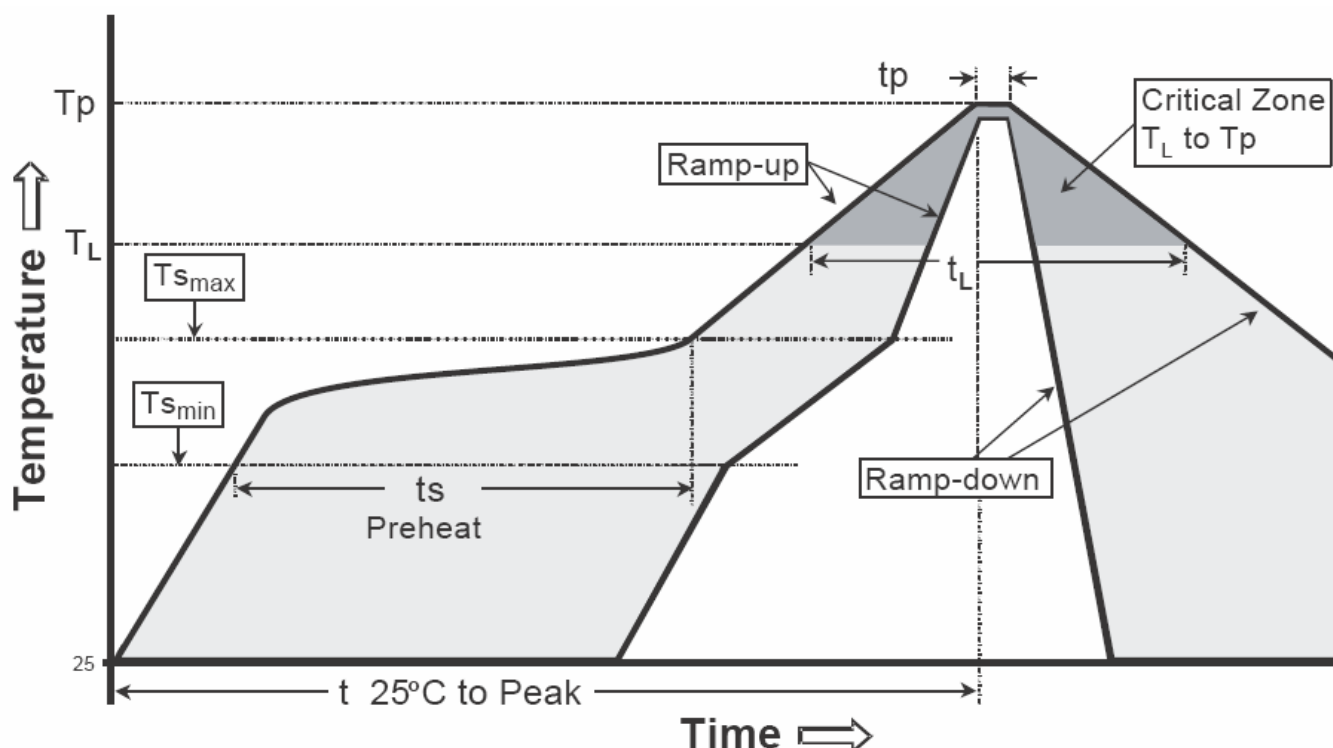
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

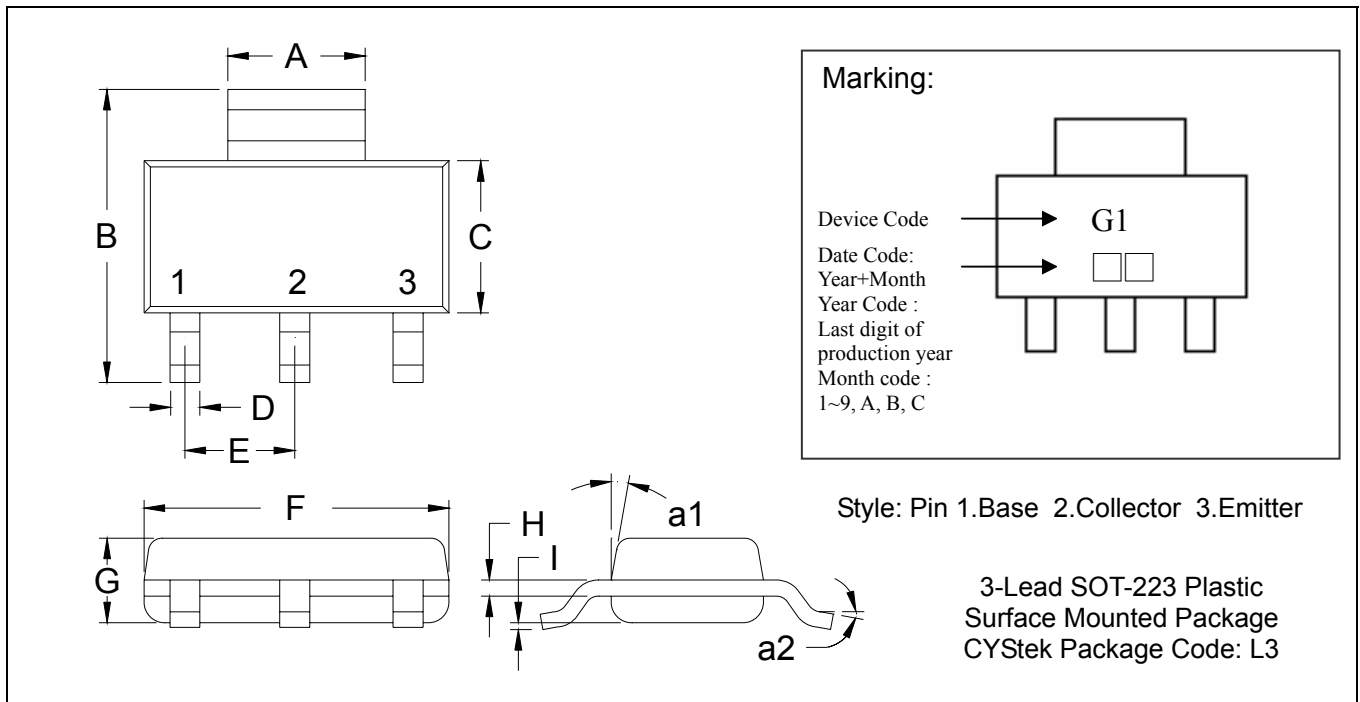
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (TL)	183°C	217°C
- Time (tL)	60-150 seconds	60-150 seconds
Peak Temperature(TP)	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-223 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1142	0.1220	2.90	3.10	G	0.0551	0.0709	1.40	1.80
B	0.2638	0.2874	6.70	7.30	H	0.0098	0.0138	0.25	0.35
C	0.1299	0.1457	3.30	3.70	I	0.0008	0.0039	0.02	0.10
D	0.0236	0.0315	0.60	0.80	a1	*13°	-	*13°	-
E	*0.0906	-	*2.30	-	a2	0°	10°	0°	10°
F	0.2480	0.2638	6.30	6.70					

- 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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