General Purpose NPN Epitaxial Planar Transistor

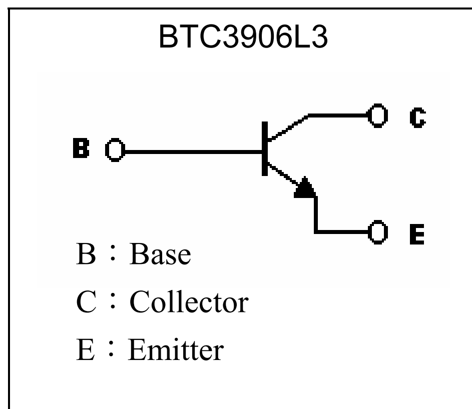
BTC3906L3

Features

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

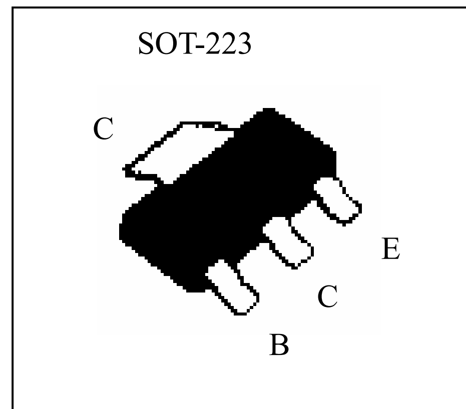
Symbol

BTC3906L3



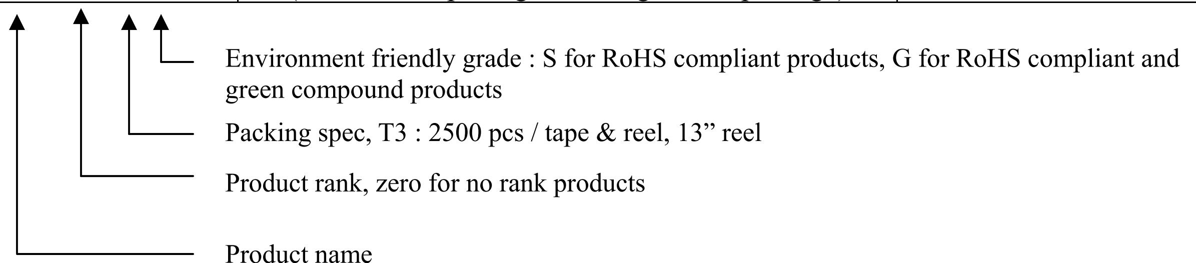
Outline

SOT-223



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_{CBO}	180	V
Collector-Emitter Voltage	V_{CEO}	160	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Power Dissipation @ T_A=25℃	Pd	1.1 (Note 1)	W
Power Dissipation @ T_A=25℃	Pd	1.3 (Note 2)	W
Power Dissipation @ T_C=25℃	Pd	5	W
Operating Junction Temperature Range	Tj	-55~+150	°C
Storage Temperature Range	Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	25	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 1)	$R_{th,j-a}$	110	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{th,j-a}$	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 $1cm^2$.

Characteristics (Ta=25°C)

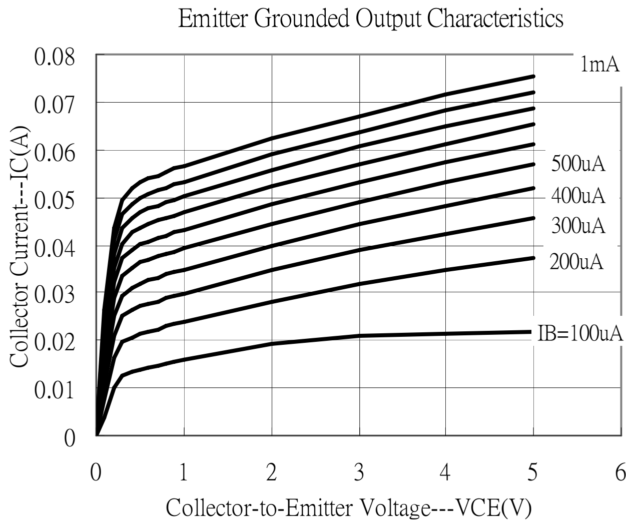
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	180	-	-	V	I_C=100μA
BV_{CEO}	160	-	-	V	I_C=1mA
BV_{EBO}	6	-	-	V	I_E=10μA
I_{CBO}	-	-	50	nA	V_{CB}=120V
I_{EBO}	-	-	50	nA	V_{EB}=4V
*$V_{CE(sat)}1$	-	0.1	0.15	V	I_C=10mA, I_B=1mA
*$V_{CE(sat)}2$	-	-	0.2	V	I_C=50mA, I_B=5mA
*$V_{BE(sat)}1$	-	-	1	V	I_C=10mA, I_B=1mA
*$V_{BE(sat)}2$	-	-	1	V	I_C=50mA, I_B=5mA
*$h_{FE}1$	100	-	-	-	V_{CE}=5V, I_C=1mA
*$h_{FE}2$	100	-	-	-	V_{CE}=5V, I_C=10mA
*$h_{FE}3$	40	-	-	-	V_{CE}=5V, I_C=50mA
*$h_{FE}4$	120	-	390	-	V_{CE}=6V, I_C=2mA
f_T	100	-	-	MHz	V_{CE}=20V, I_C=10mA, f=100MHz
Cob	-	-	6	pF	V_{CB}=20V, I_E=0A,f=1MHz

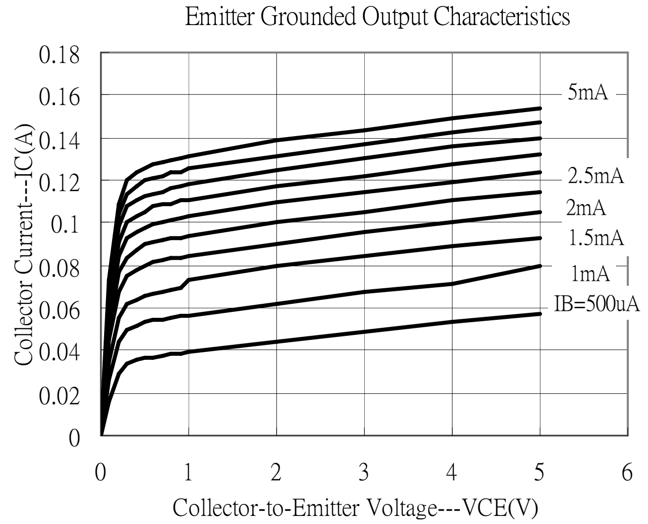
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

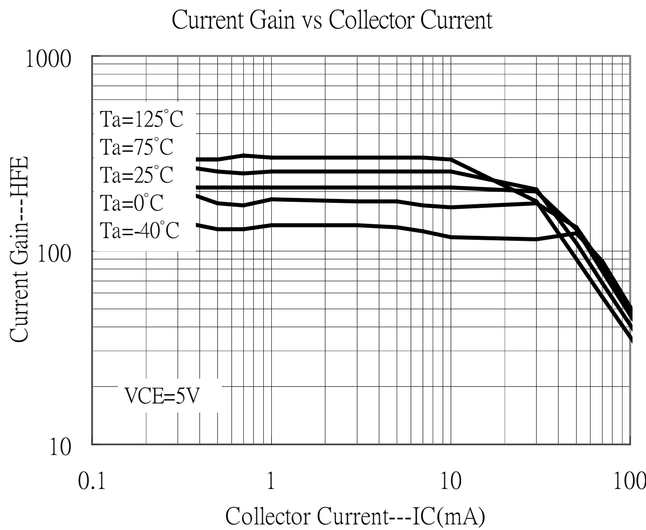
Classification Of h_{FE} 4

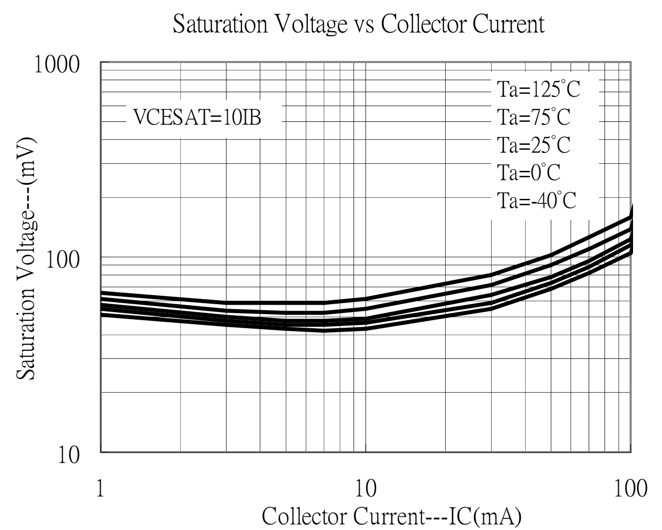
Rank	Q	R
Range	120~270	180~390

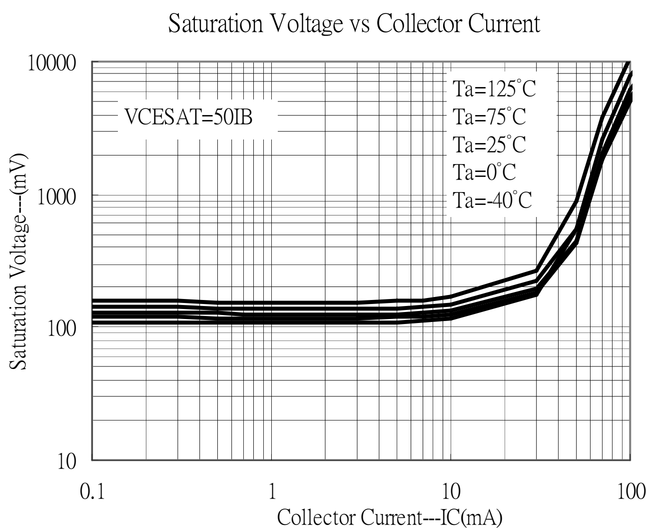
Typical Characteristics

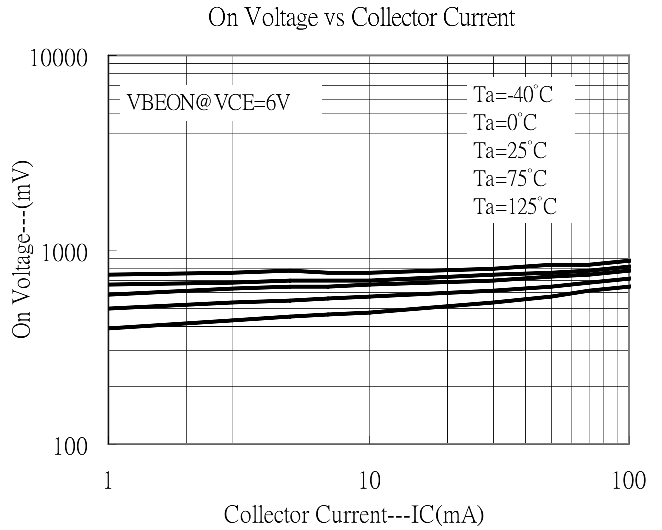




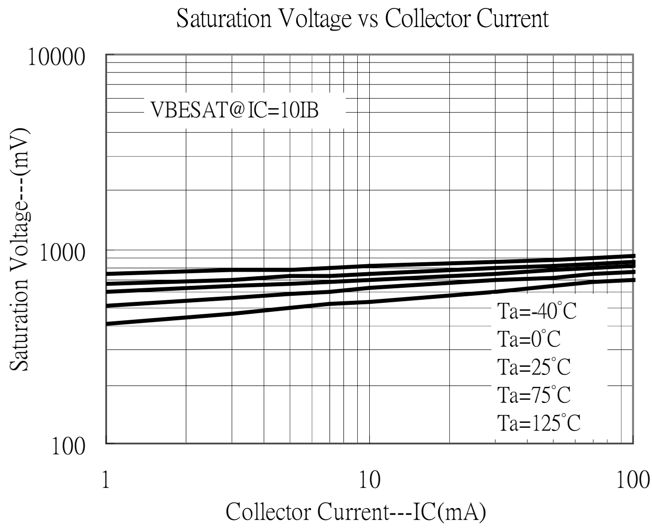


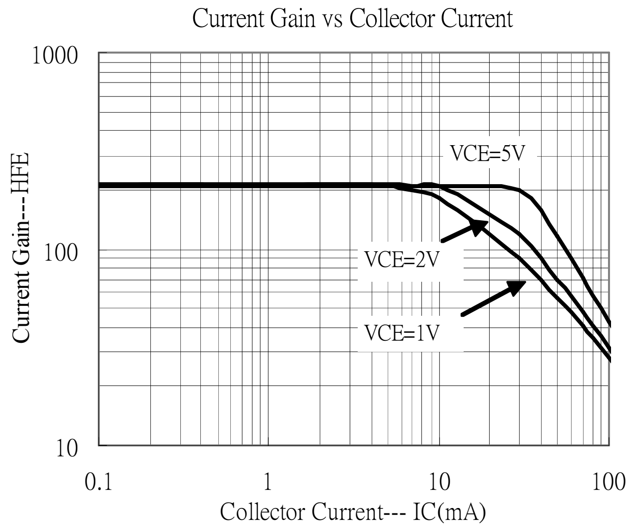


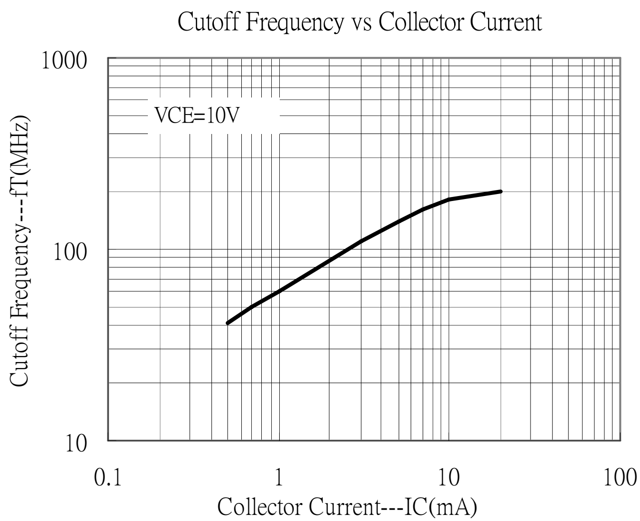


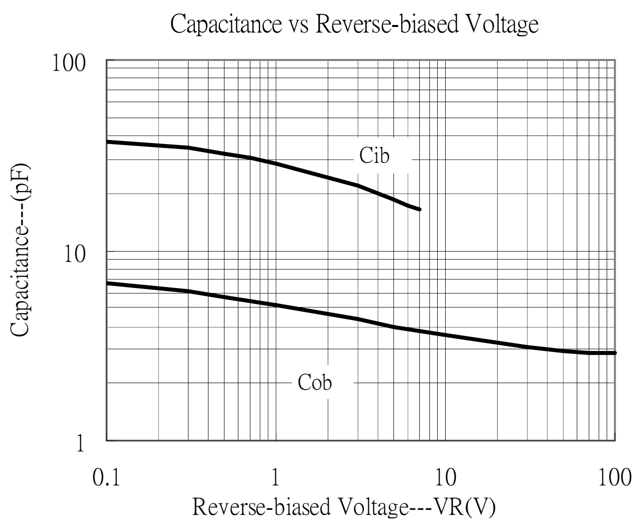


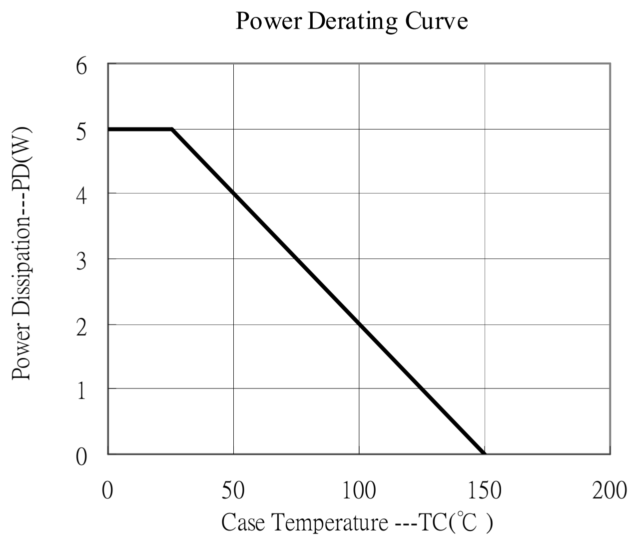
Typical Characteristics(Cont.)

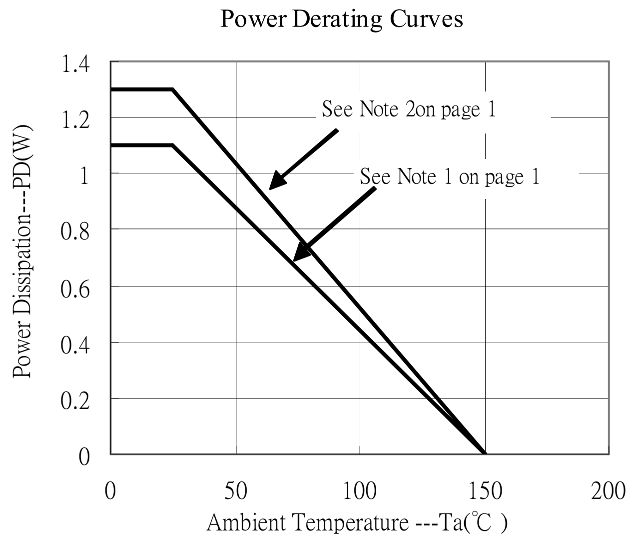




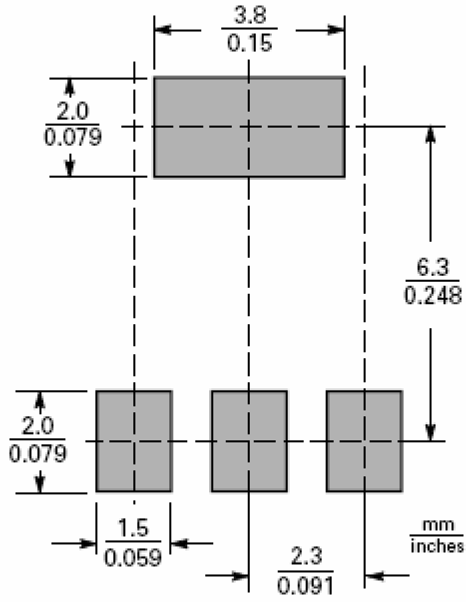




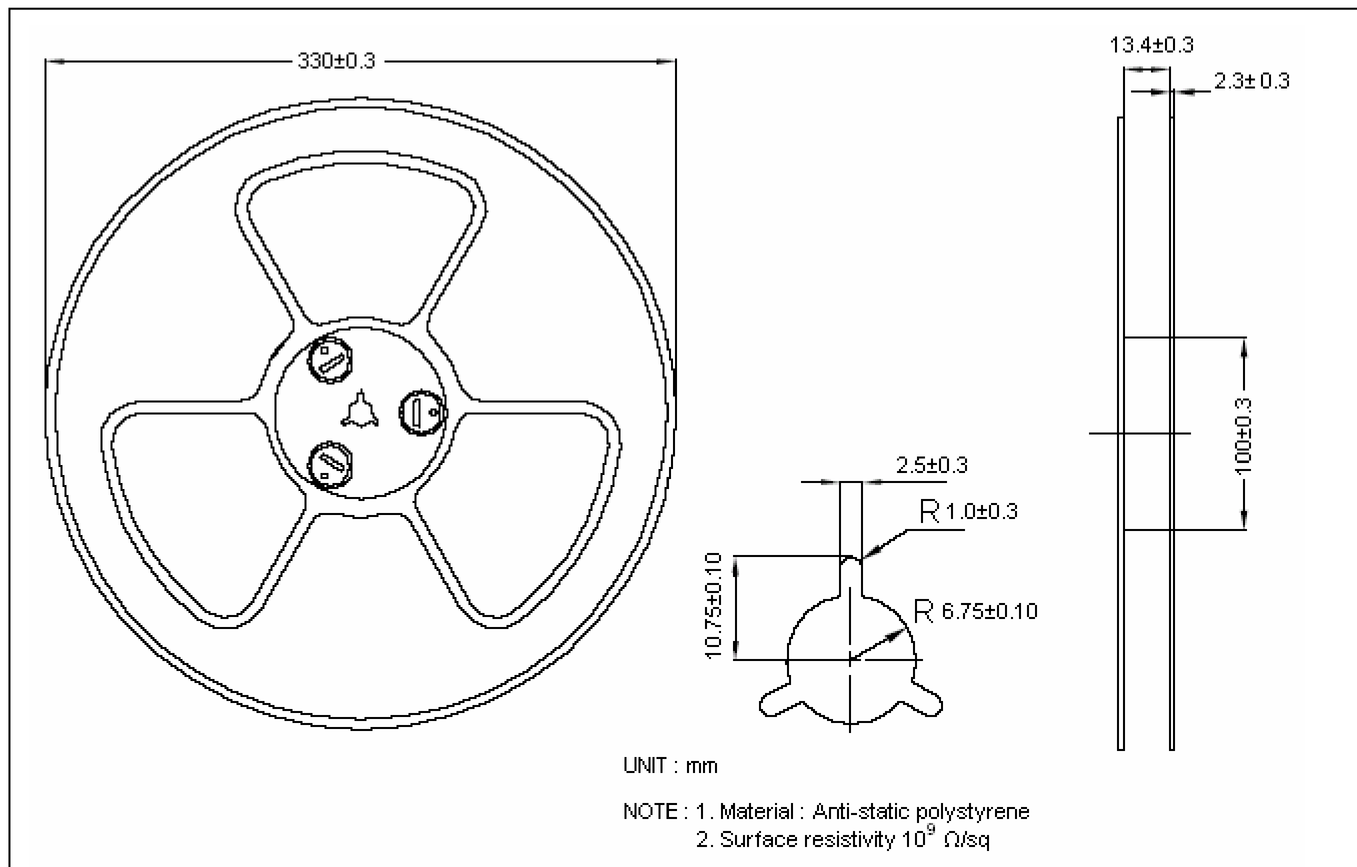




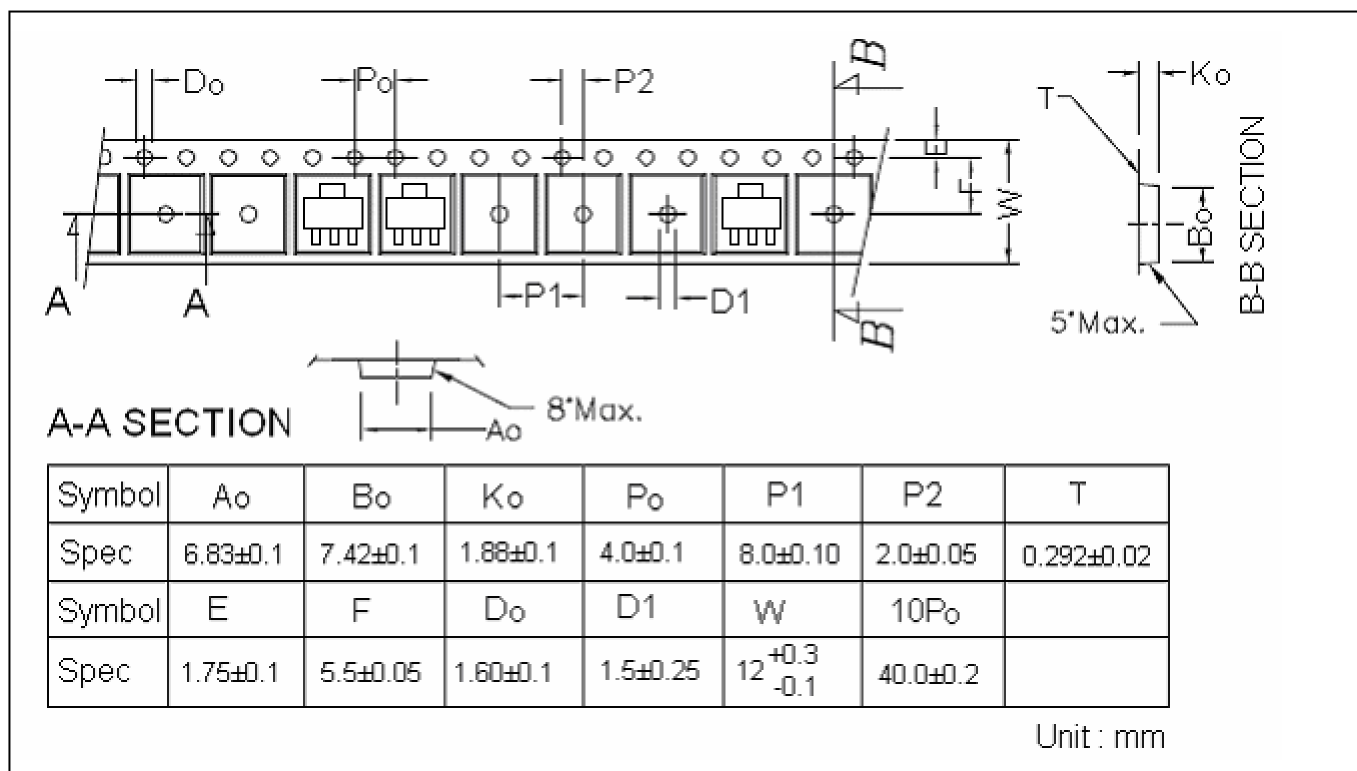
Recommended soldering footprint



Reel Dimension



Carrier Tape Dimension



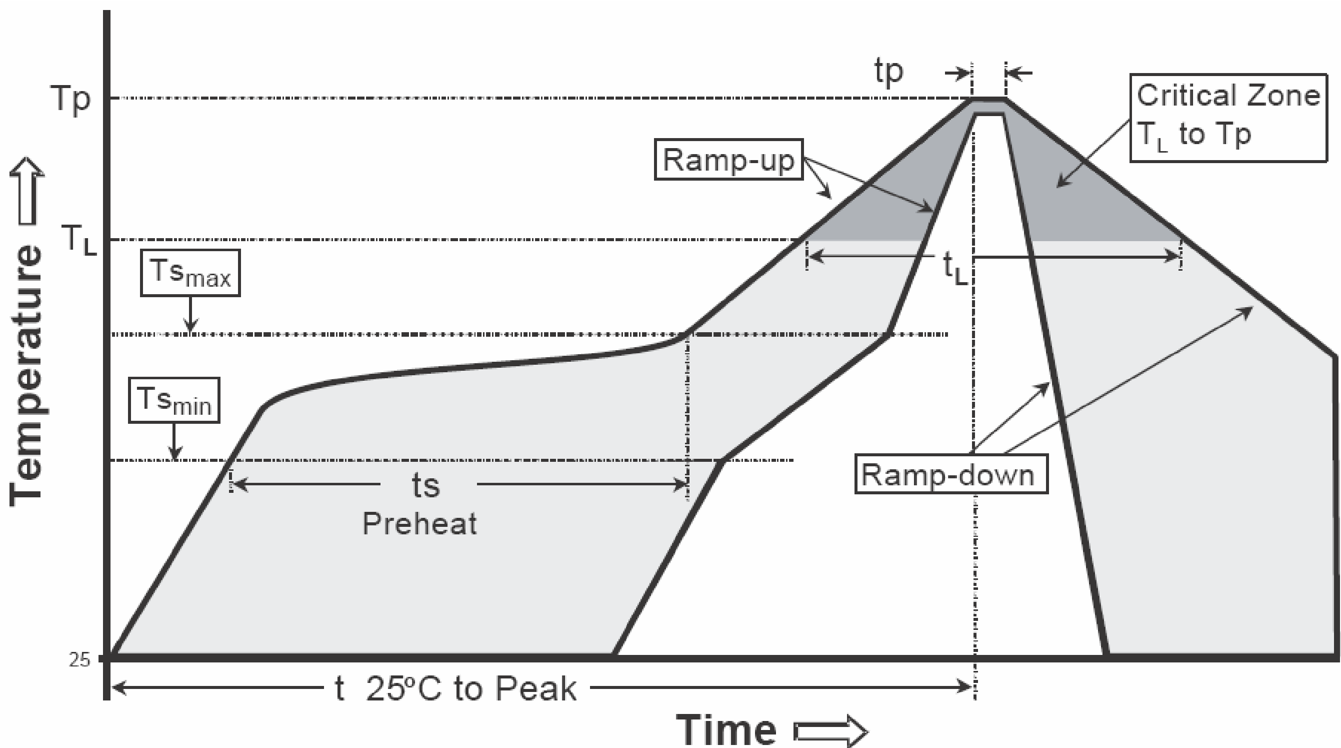
Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

Unit : mm

Recommended wave soldering condition

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

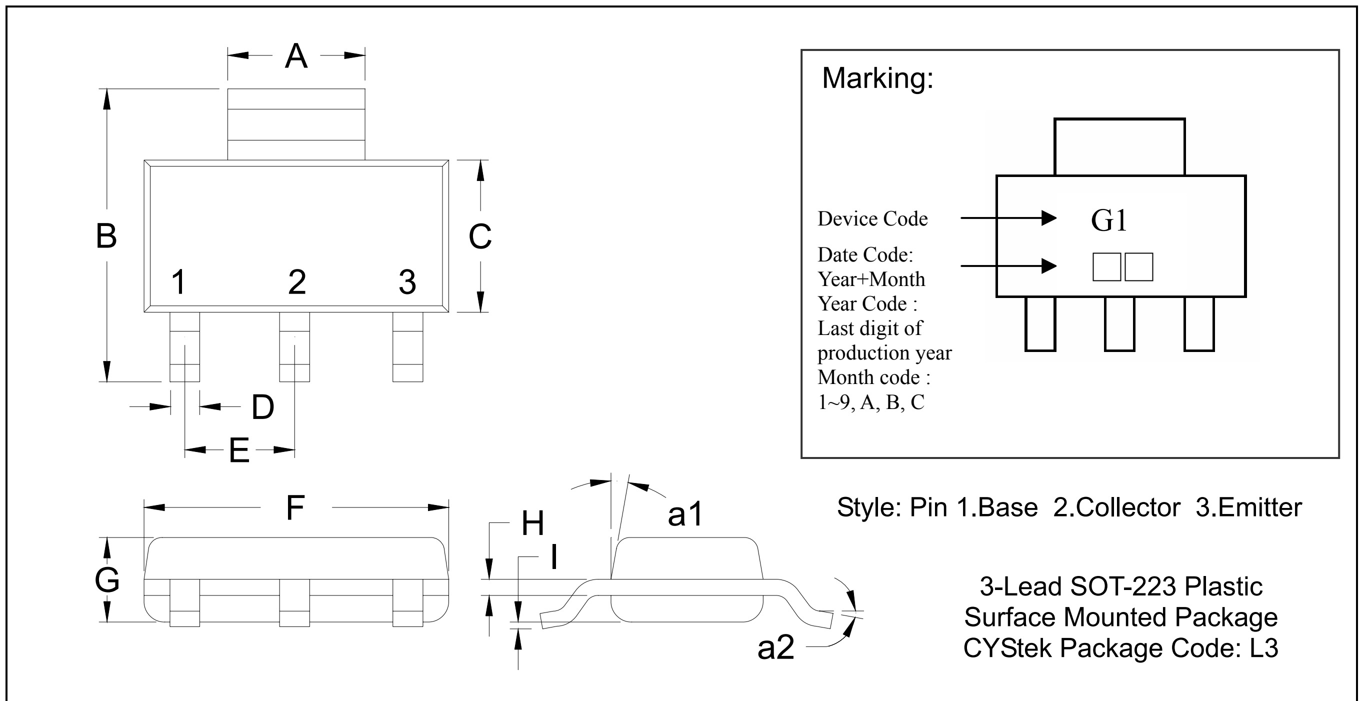
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts_{min} to ts_{max})	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T_P)	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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