

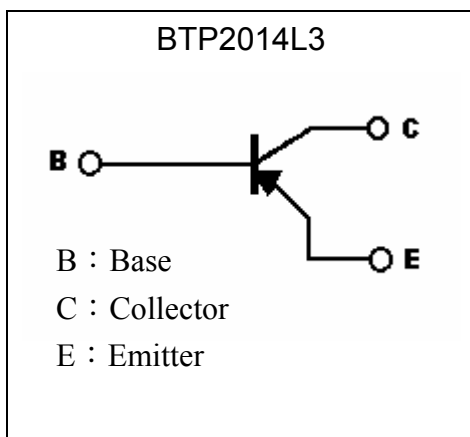
PNP Epitaxial Planar High Current (High Performance) Transistor

BTP2014L3

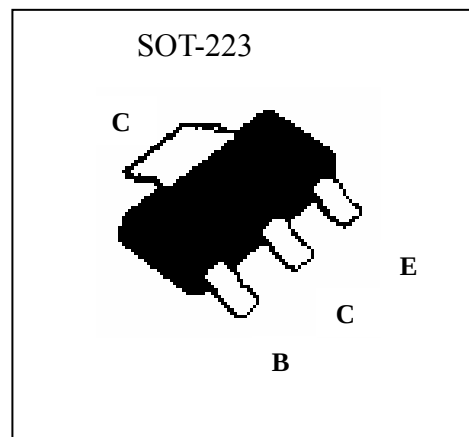
Features

- 4 Amps continuous current, up to 10 Amps peak current
- Very low saturation voltage
- Extremely low equivalent on resistance, $R_{CE(SAT)}=79m\Omega$ typ. at 3A
- Pb-free lead plating and halogen-free package

Symbol



Outline



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	-180	V
Collector-Emitter Voltage	V_{CEO}	-140	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current	I_C	-4	A
Peak Collector Current	I_{CP}	-10	A
Base Current	I_B	-1	A
Power Dissipation @Ta=25°C	P_D	3 (Note 1)	W
		1.6 (Note 2)	W
Operating and Storage Temperature Range	$T_j ; T_{stg}$	-55 ~ +150	°C

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	12.5	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	41.7 (Note 1)	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-ambient, max		78 (Note 2)	$^{\circ}\text{C/W}$

Note: 1.For a device surface mounted on 52mmx52mmx1.6mm FR 4 PCB of 2oz. copper, in still air condition.

2.For a device surface mounted on 25mmx25mmx1.6mm FR 4 PCB of 1oz. copper, in still air condition.

Characteristics ($T_a=25^{\circ}\text{C}$, unless otherwise specified)

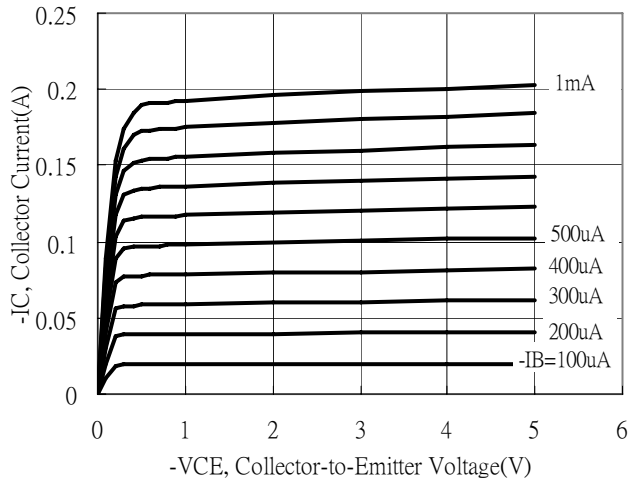
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-180	-200	-	V	$I_C=-100\mu\text{A}$
BV_{CER}	-180	-200	-	V	$I_C=-1\mu\text{A}$, $R_{BE}\leq 1\text{k}\Omega$
$*BV_{CEO}$	-140	-160	-	V	$I_C=-10\text{mA}$
BV_{EBO}	-7	-8	-	V	$I_E=-100\mu\text{A}$
I_{CBO}	-	-	-20	nA	$V_{CB}=-150\text{V}$
I_{CER}	-	-	-20	nA	$V_{CE}=-150\text{V}$, $R_{BE}\leq 1\text{k}\Omega$
I_{EBO}	-	-	-10	nA	$V_{EB}=-6\text{V}$
$*V_{CE(sat)1}$	-	-39	-60	mV	$I_C=-100\text{mA}$, $I_B=-5\text{mA}$
$*V_{CE(sat)2}$	-	-52	-80	mV	$I_C=-500\text{mA}$, $I_B=-50\text{mA}$
$*V_{CE(sat)3}$	-	-84	-120	mV	$I_C=-1\text{A}$, $I_B=-100\text{mA}$
$*V_{CE(sat)4}$	-	-236	-360	mV	$I_C=-3\text{A}$, $I_B=-300\text{mA}$
$*R_{CE(sat)}$	-	79	120	$\text{m}\Omega$	$I_C=-3\text{A}$, $I_B=-300\text{mA}$
$*V_{BE(sat)}$	-	-965	-1040	mV	$I_C=-3\text{A}$, $I_B=-300\text{mA}$
$*V_{BE(on)}$	-	-853	-930	mV	$V_{CE}=-5\text{V}$, $I_C=-3\text{A}$
h_{FE1}	100	225	-	-	$V_{CE}=-5\text{V}$, $I_C=-10\text{mA}$
h_{FE2}	100	200	300	-	$V_{CE}=-5\text{V}$, $I_C=-1\text{A}$
$*h_{FE3}$	35	-	-	-	$V_{CE}=-5\text{V}$, $I_C=-3\text{A}$
$*h_{FE4}$	-	5	-	-	$V_{CE}=-5\text{V}$, $I_C=-10\text{A}$
f_T	-	120	-	MHz	$V_{CE}=-10\text{V}$, $I_C=-100\text{mA}$, $f=50\text{MHz}$
Cob	-	31	-	pF	$V_{CB}=-10\text{V}$, $f=1\text{MHz}$
ton		42		ns	$I_C=-1\text{A}$, $I_{B1}=-100\text{mA}$, $I_{B2}=100\text{mA}$, $V_{CC}=-50\text{V}$
toff		636		ns	

*Pulse Test: Pulse Width $\leq 380\mu\text{s}$, Duty Cycle $\leq 2\%$ **Ordering Information**

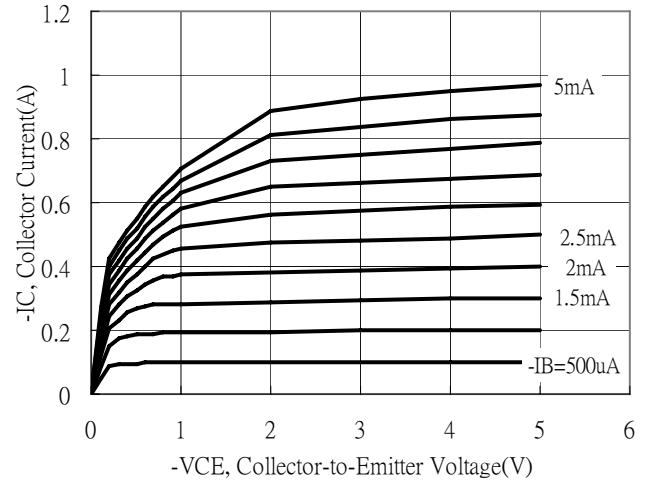
Device	Package	Shipping
BTP2014L3-0-T3-G	SOT-223 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

Typical Characteristics

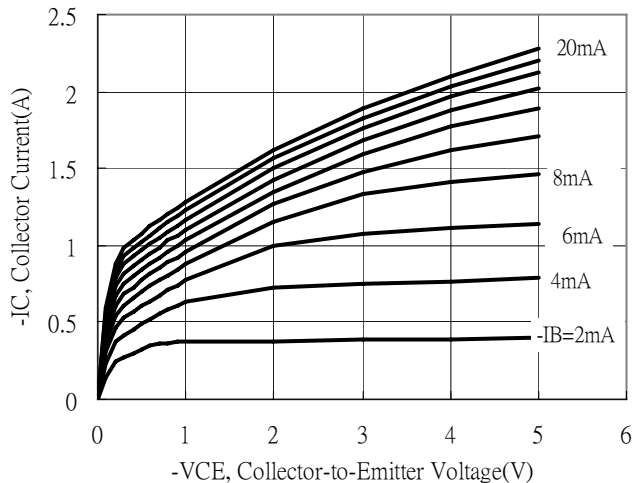
Emitter Grounded Output Characteristics



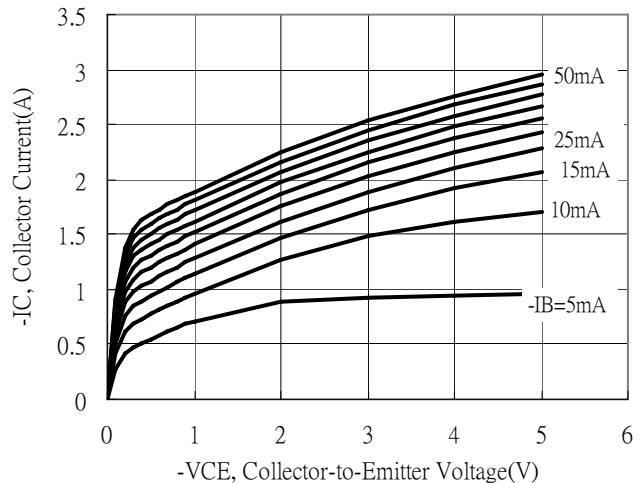
Emitter Grounded Output Characteristics



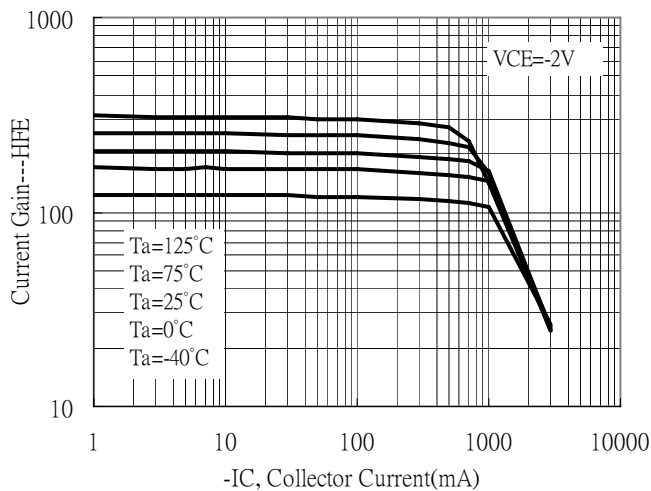
Emitter Grounded Output Characteristics



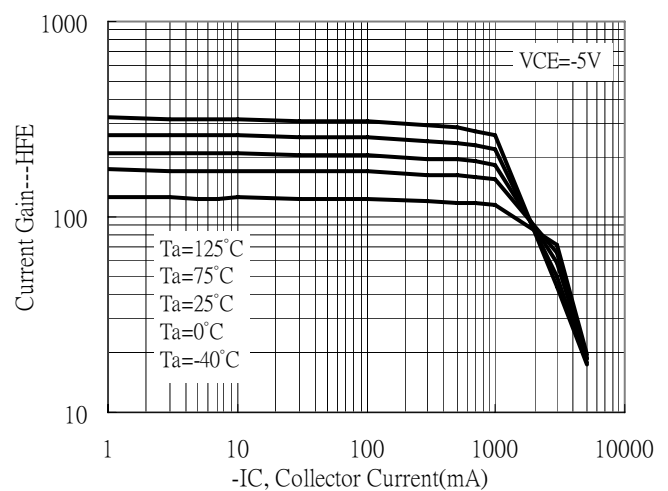
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

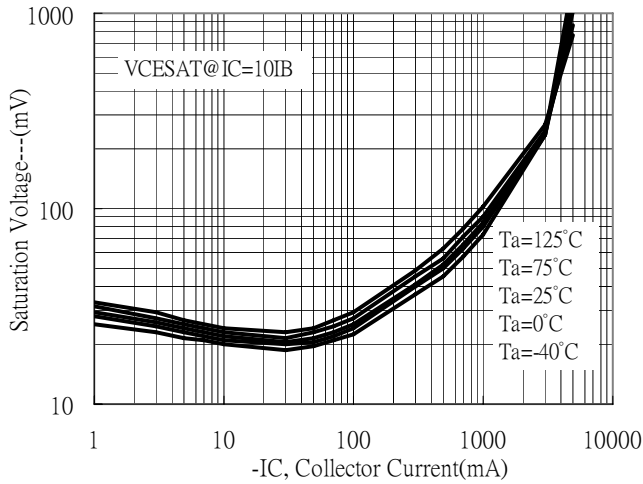


Current Gain vs Collector Current

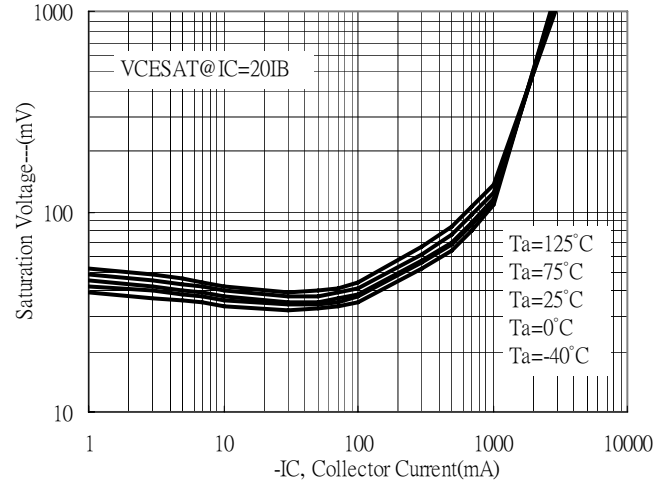


Typical Characteristics(Cont.)

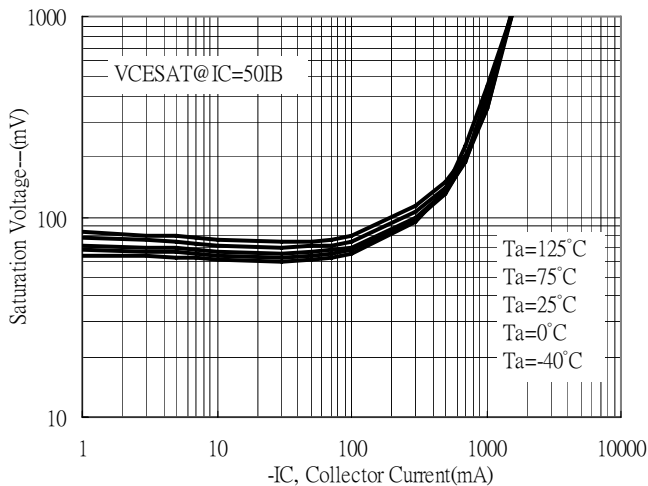
Saturation Voltage vs Collector Current



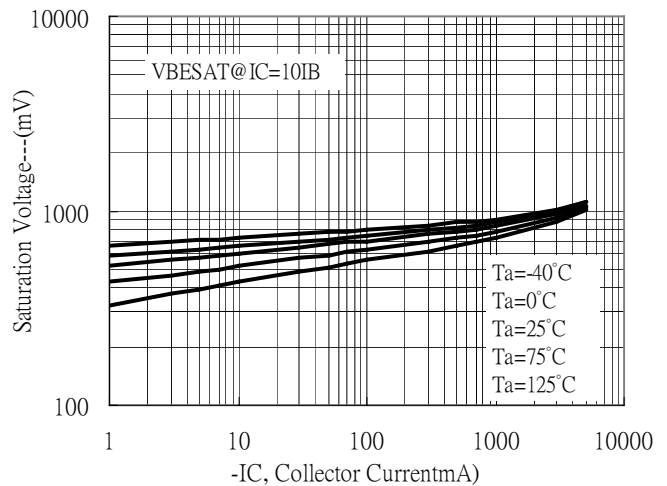
Saturation Voltage vs Collector Current



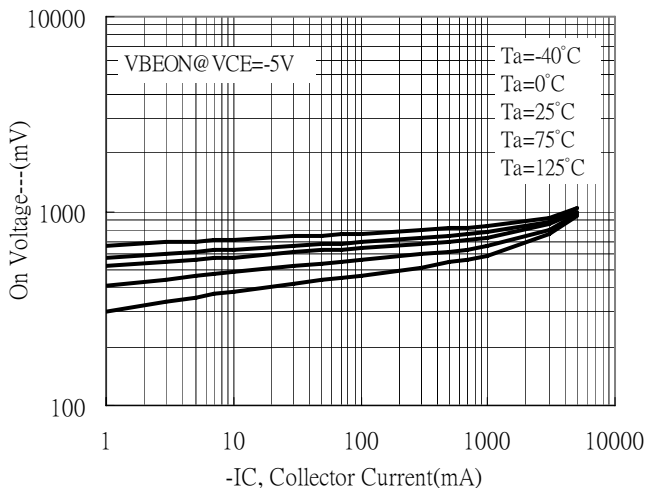
Saturation Voltage vs Collector Current



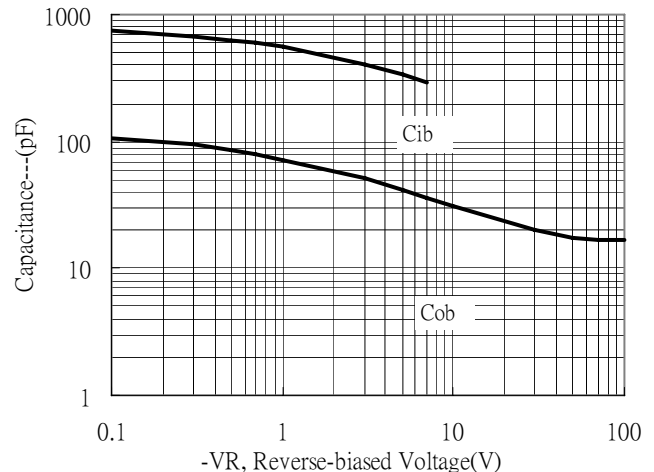
Saturation Voltage vs Collector Current



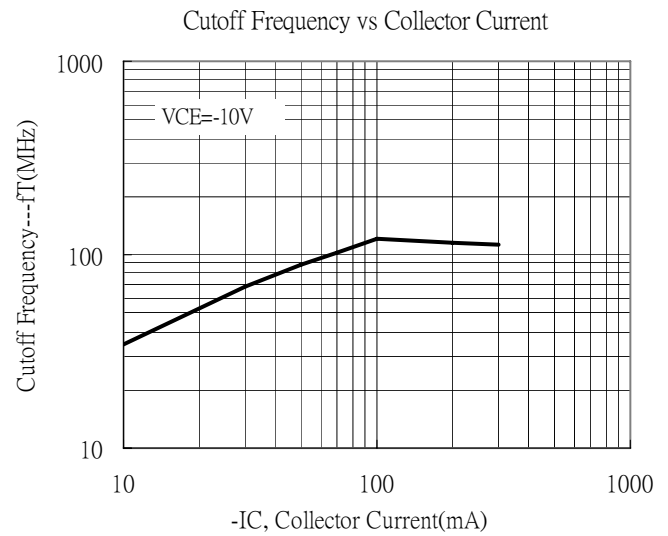
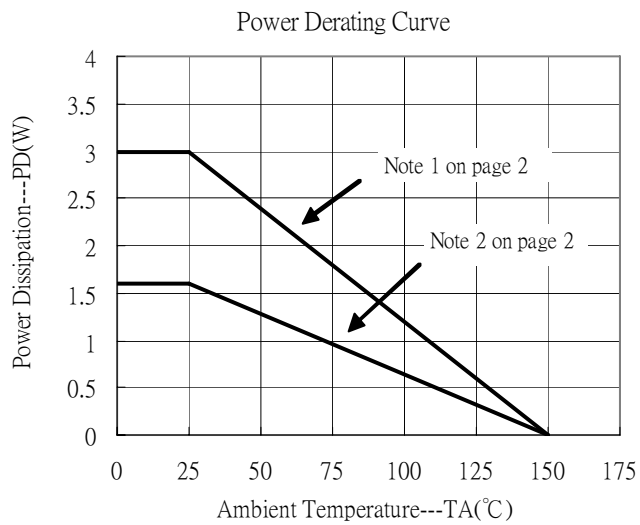
On Voltage vs Collector Current



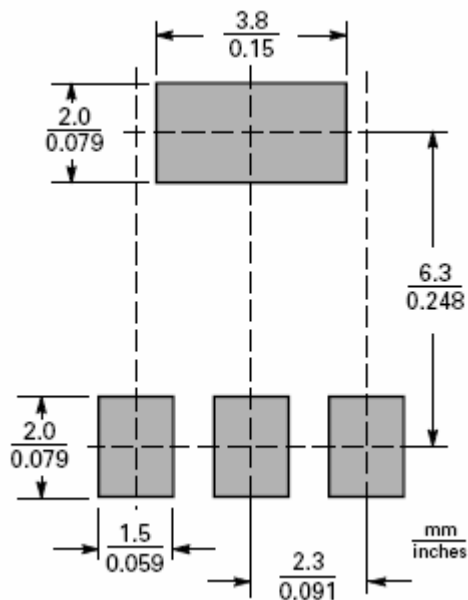
Capacitance vs Reverse-biased Voltage



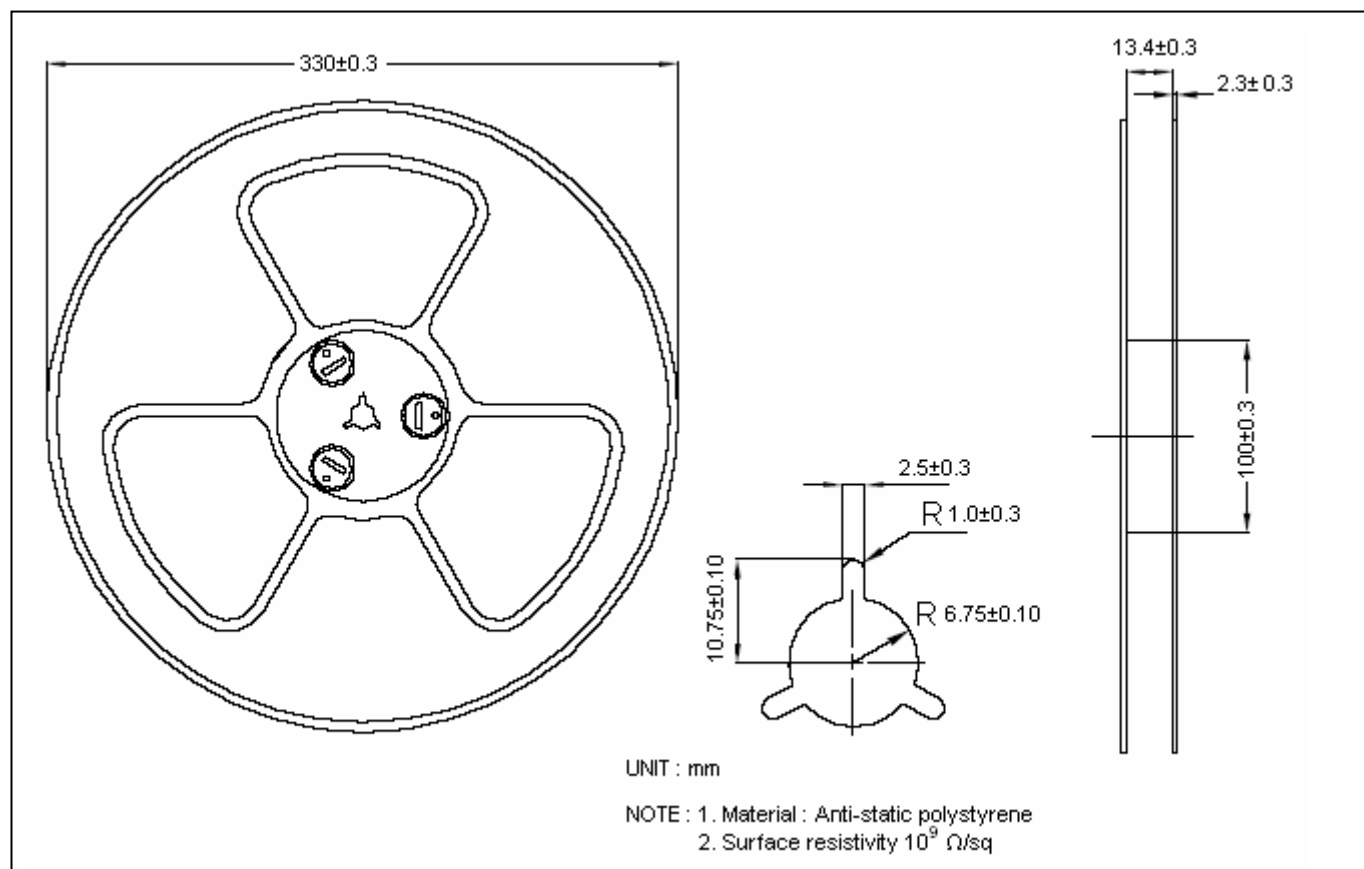
Typical Characteristics(Cont.)



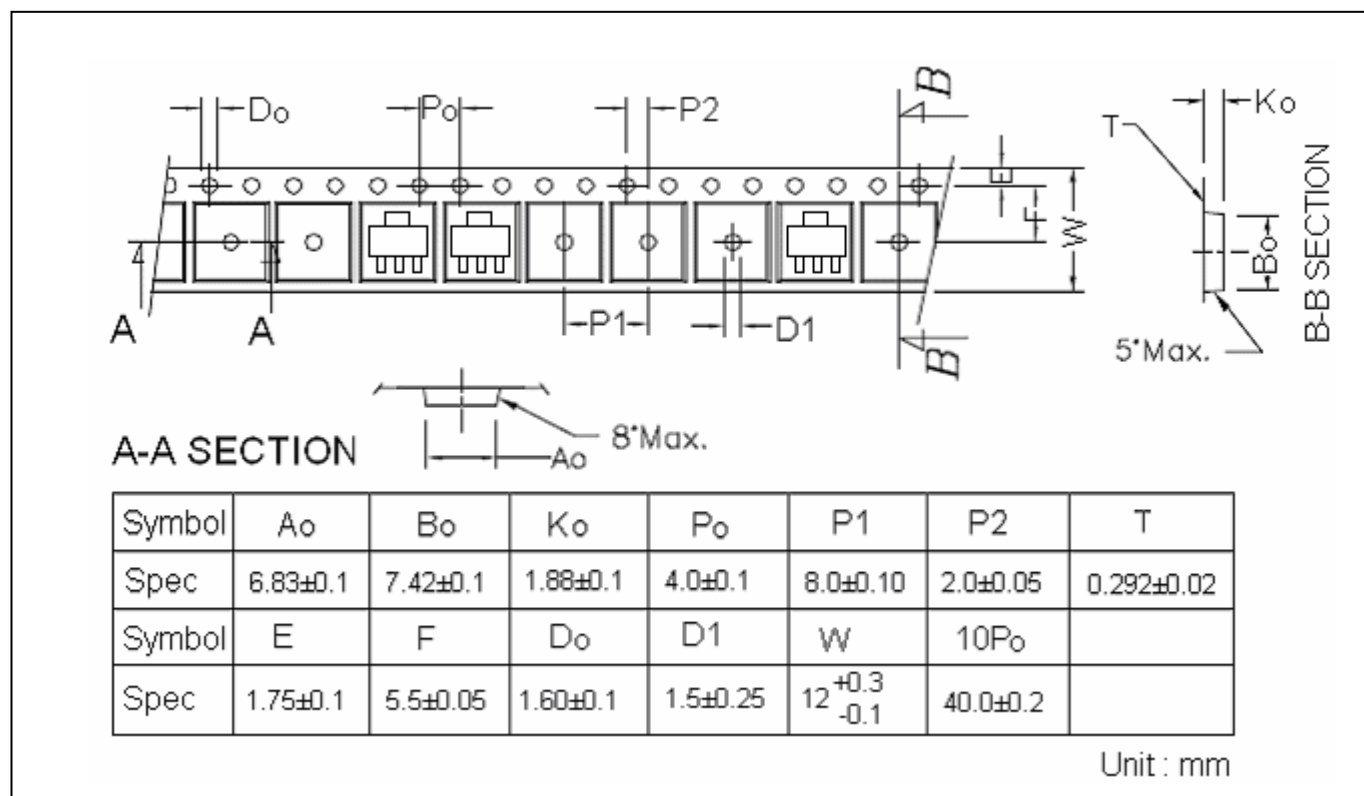
Recommended soldering footprint



Reel Dimension



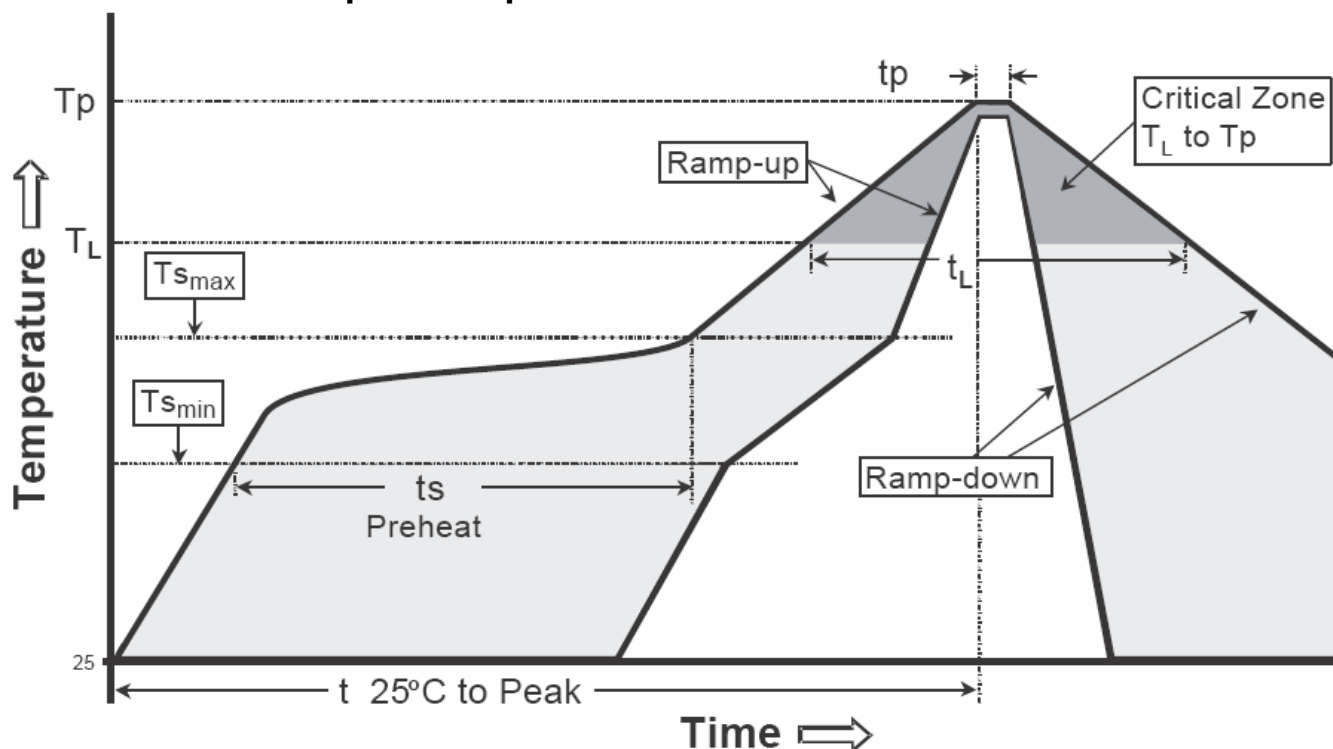
Carrier Tape Dimension



Recommended wave soldering condition

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

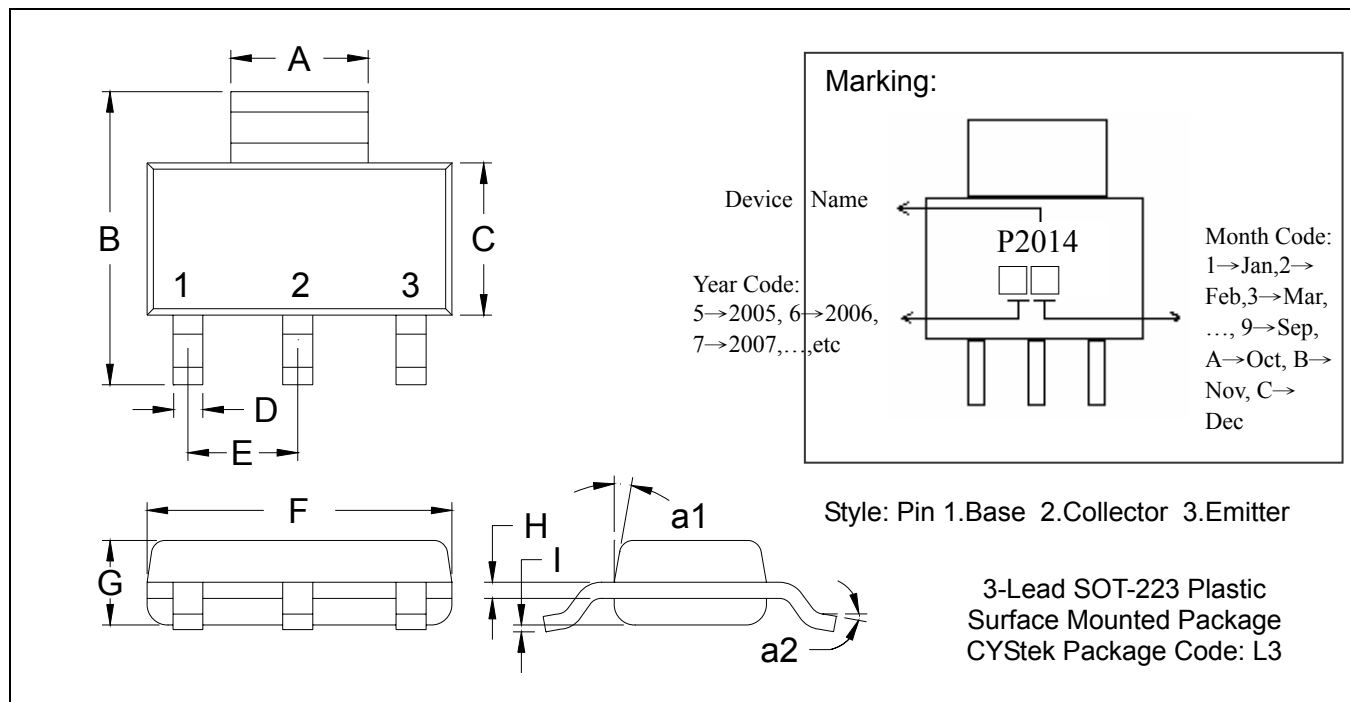
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax 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

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.