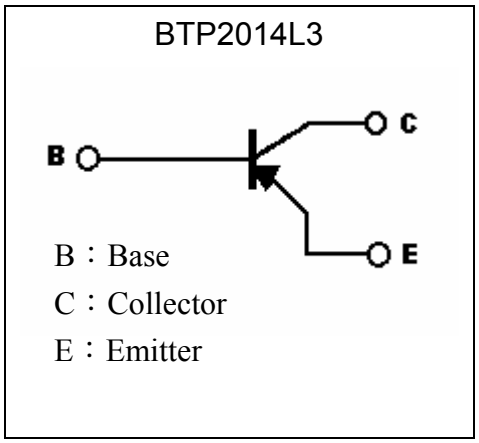
PNP Epitaxial Planar High Current (High Performance) Transistor

BTP2014L3

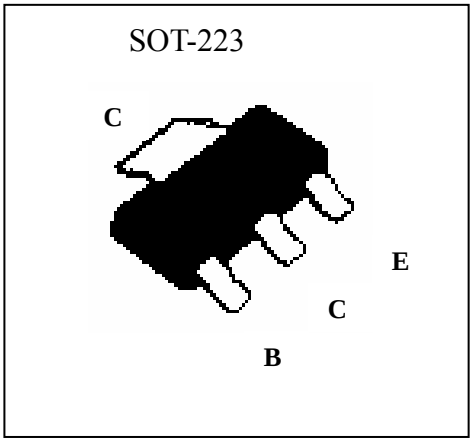
Features

- 4 Amps continuous current, up to 10 Amps peak current
- Very low saturation voltage
- Extremely low equivalent on resistance, $R_{CE(SAT)}$=79mΩ 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 @T_A=25°C	P_D	3 (Note 1)	W
		1.6 (Note 2)	W
Operating and Storage Temperature Range	Tj ; Tstg	-55 ~ +150	°C

Thermal Data

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

Note: 1.For a device surface mounted on 52mm×52mm×1.6mm FR 4 PCB of 2oz. copper, in still air condition.
2.For a device surface mounted on 25mm×25mm×1.6mm FR 4 PCB of 1oz. copper, in still air condition.

Characteristics (Ta=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-180	-200	-	V	I_C=-100μA
BV_{CER}	-180	-200	-	V	I_C=-1μA, R_{BE}≤1kΩ
*BV_{CEO}	-140	-160	-	V	I_C=-10mA
BV_{EBO}	-7	-8	-	V	I_E=-100μA
I_{CBO}	-	-	-20	nA	V_{CB}=-150V
I_{CER}	-	-	-20	nA	V_{CE}=-150V, R_{BE}≤1kΩ
I_{EBO}	-	-	-10	nA	V_{EB}=-6V
*$V_{CE(sat)}$1	-	-39	-60	mV	I_C=-100mA, I_B=-5mA
*$V_{CE(sat)}$2	-	-52	-80	mV	I_C=-500mA, I_B=-50mA
*$V_{CE(sat)}$3	-	-84	-120	mV	I_C=-1A, I_B=-100mA
*$V_{CE(sat)}$4	-	-236	-360	mV	I_C=-3A, I_B=-300mA
*$R_{CE(sat)}$	-	79	120	mΩ	I_C=-3A, I_B=-300mA
*$V_{BE(sat)}$	-	-965	-1040	mV	I_C=-3A, I_B=-300mA
*$V_{BE(on)}$	-	-853	-930	mV	V_{CE}=-5V, I_C=-3A
h_{FE}1	100	225	-	-	V_{CE}=-5V, I_C=-10mA
h_{FE}2	100	200	300	-	V_{CE}=-5V, I_C=-1A
*h_{FE}3	35	-	-	-	V_{CE}=-5V, I_C=-3A
*h_{FE}4	-	5	-	-	V_{CE}=-5V, I_C=-10A
f_T	-	120	-	MHz	V_{CE}=-10V, I_C=-100mA, f=50MHz
Cob	-	31	-	pF	V_{CB}=-10V, f=1MHz
ton		42		ns	I_C=-1A, I_B1=-100mA, I_B2=100mA, V_{CC}=-50V
toff		636		ns	

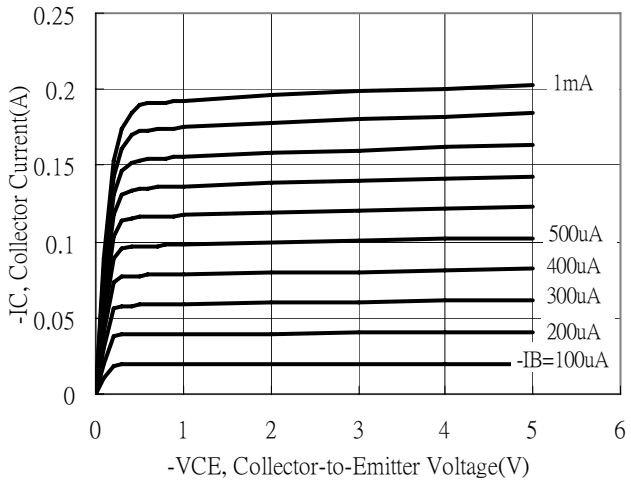
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

Ordering Information

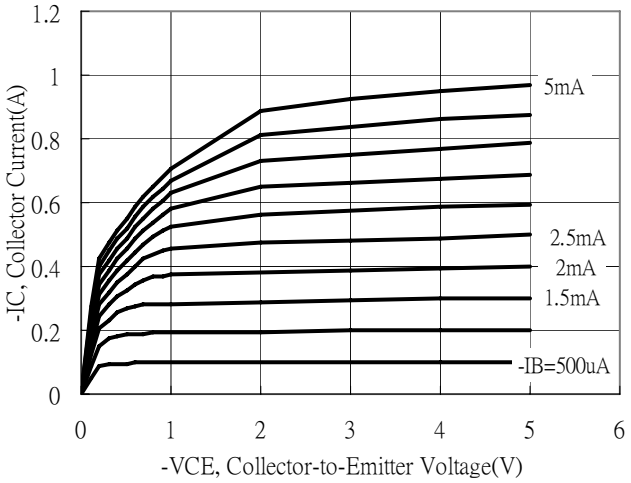
Device	Package	Shipping
BTP2014L3-0-T3-G	SOT-223 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

Typical Characteristics

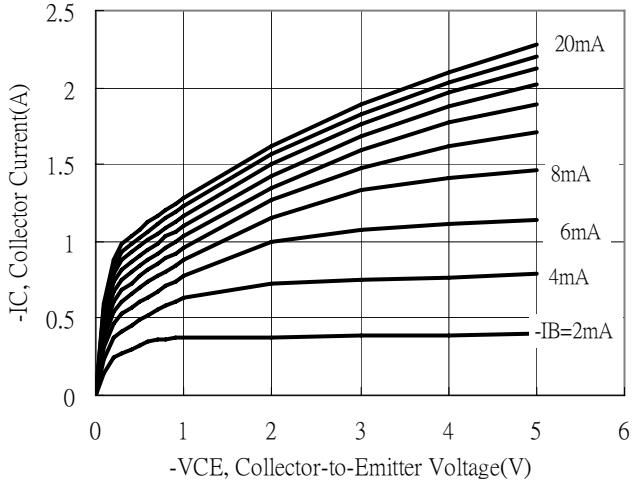
Emitter Grounded Output Characteristics



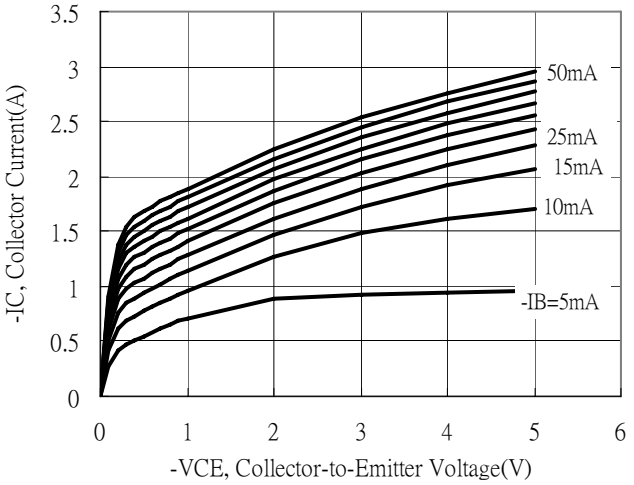
Emitter Grounded Output Characteristics



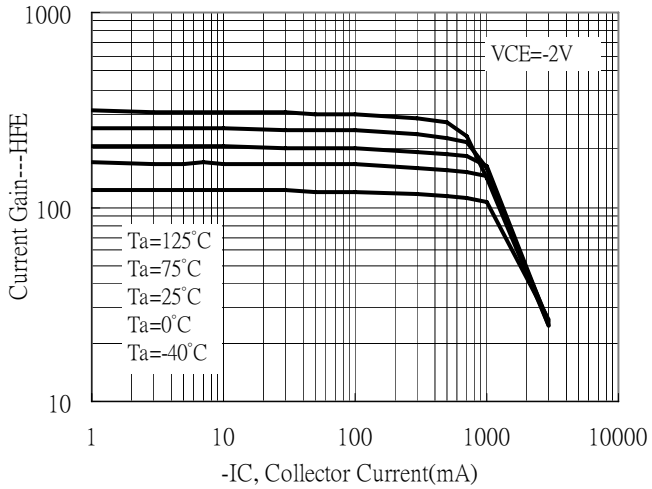
Emitter Grounded Output Characteristics



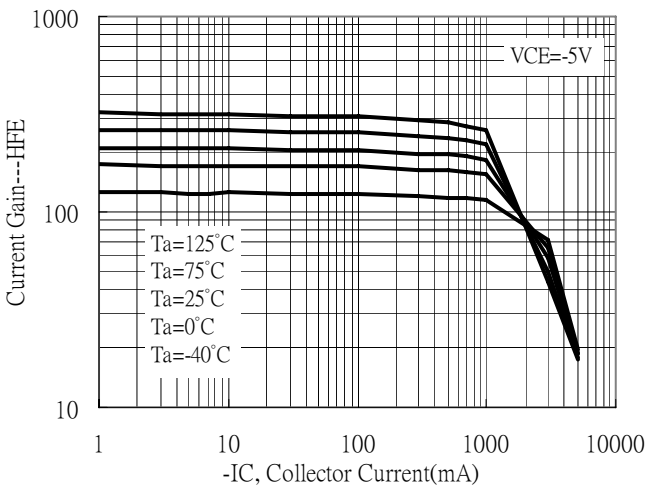
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

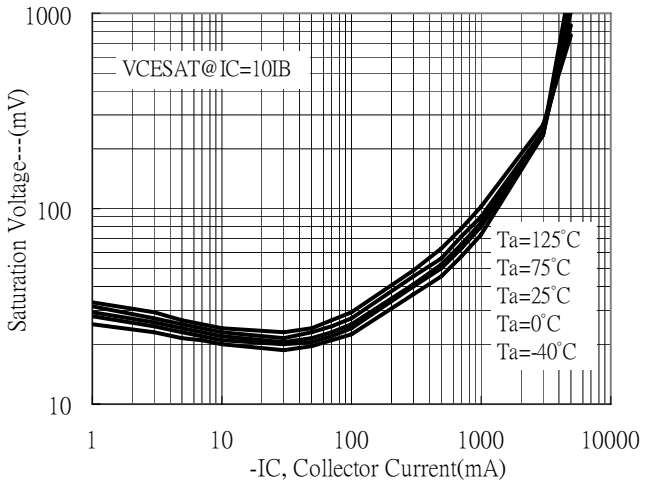


Current Gain vs Collector Current

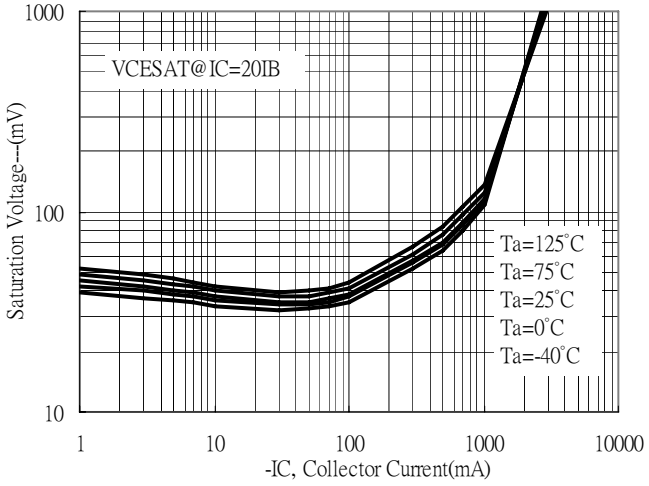


Typical Characteristics(Cont.)

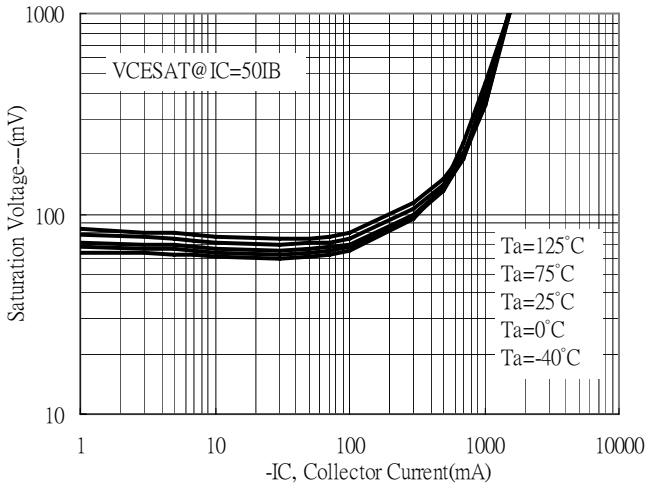
Saturation Voltage vs Collector Current



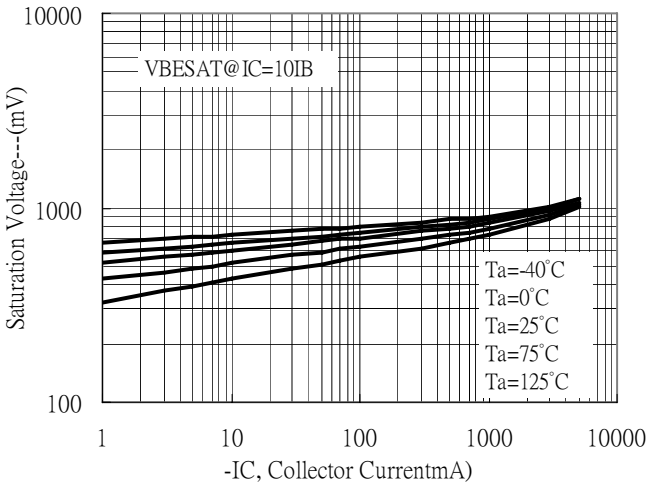
Saturation Voltage vs Collector Current



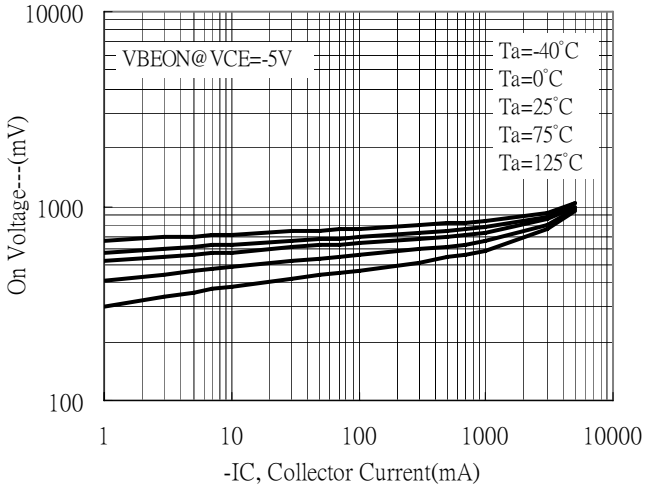
Saturation Voltage vs Collector Current



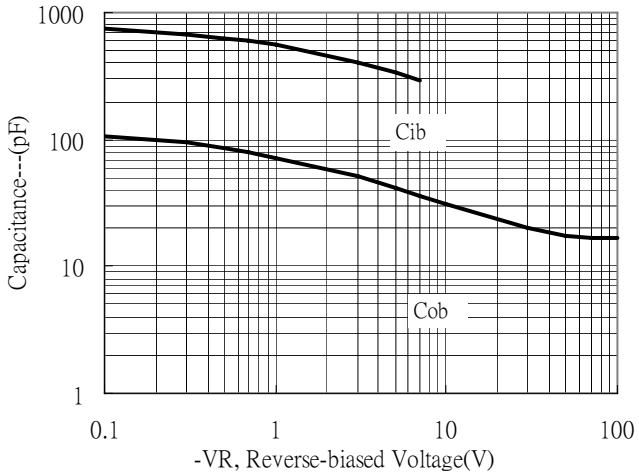
Saturation Voltage vs Collector Current



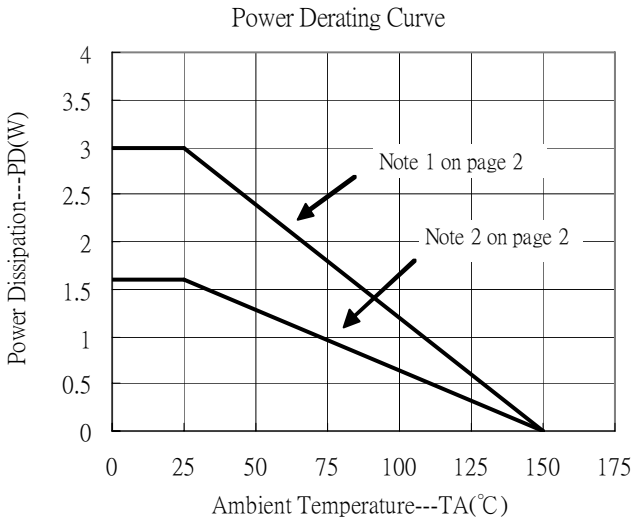
On Voltage vs Collector Current

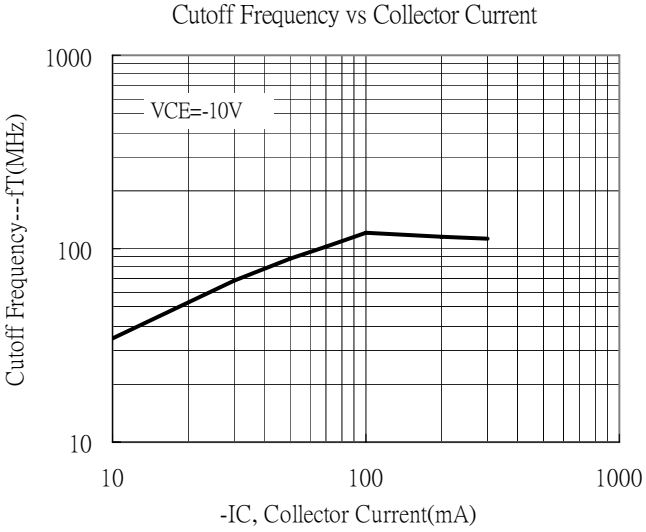


Capacitance vs Reverse-biased Voltage

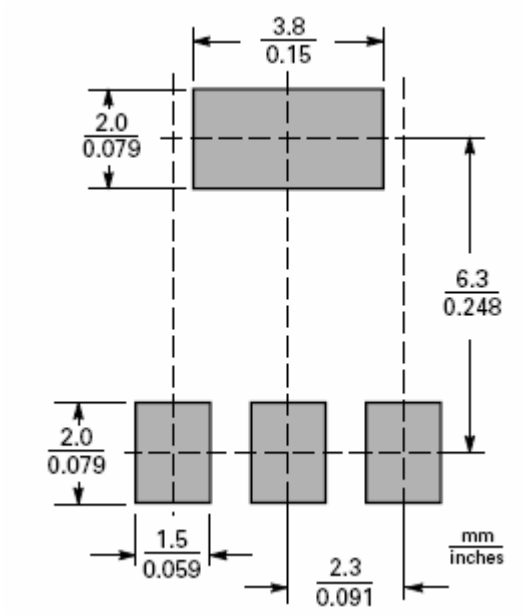


Typical Characteristics(Cont.)

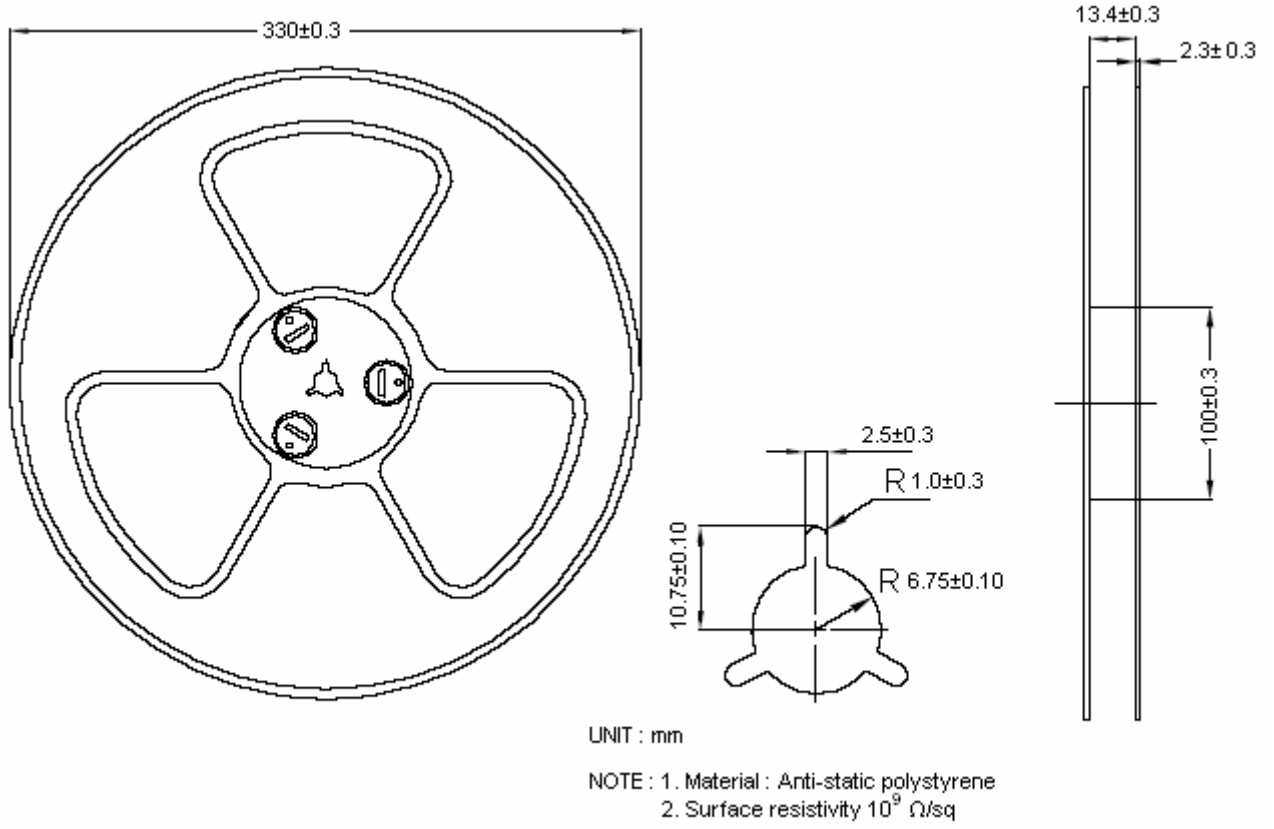




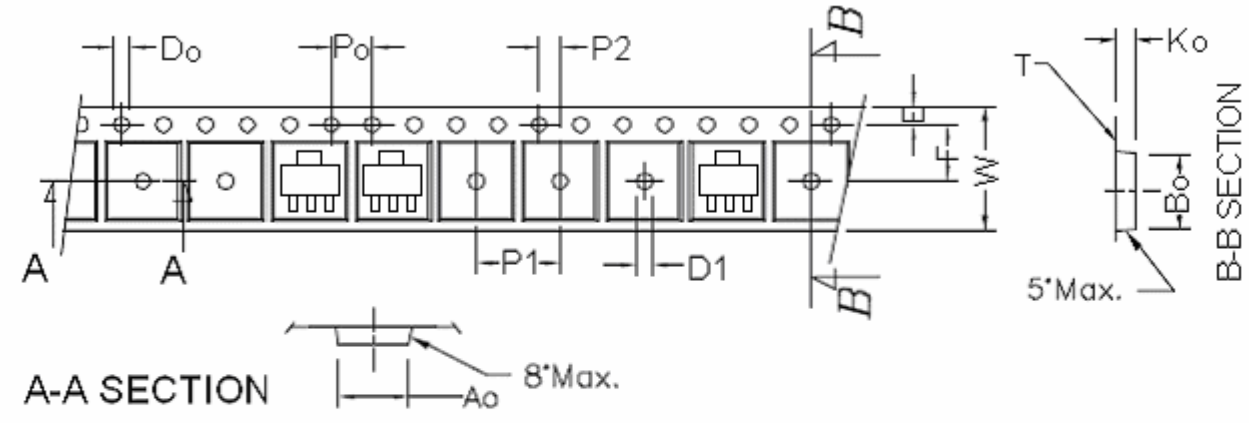
Recommended soldering footprint



Reel Dimension



Carrier Tape Dimension



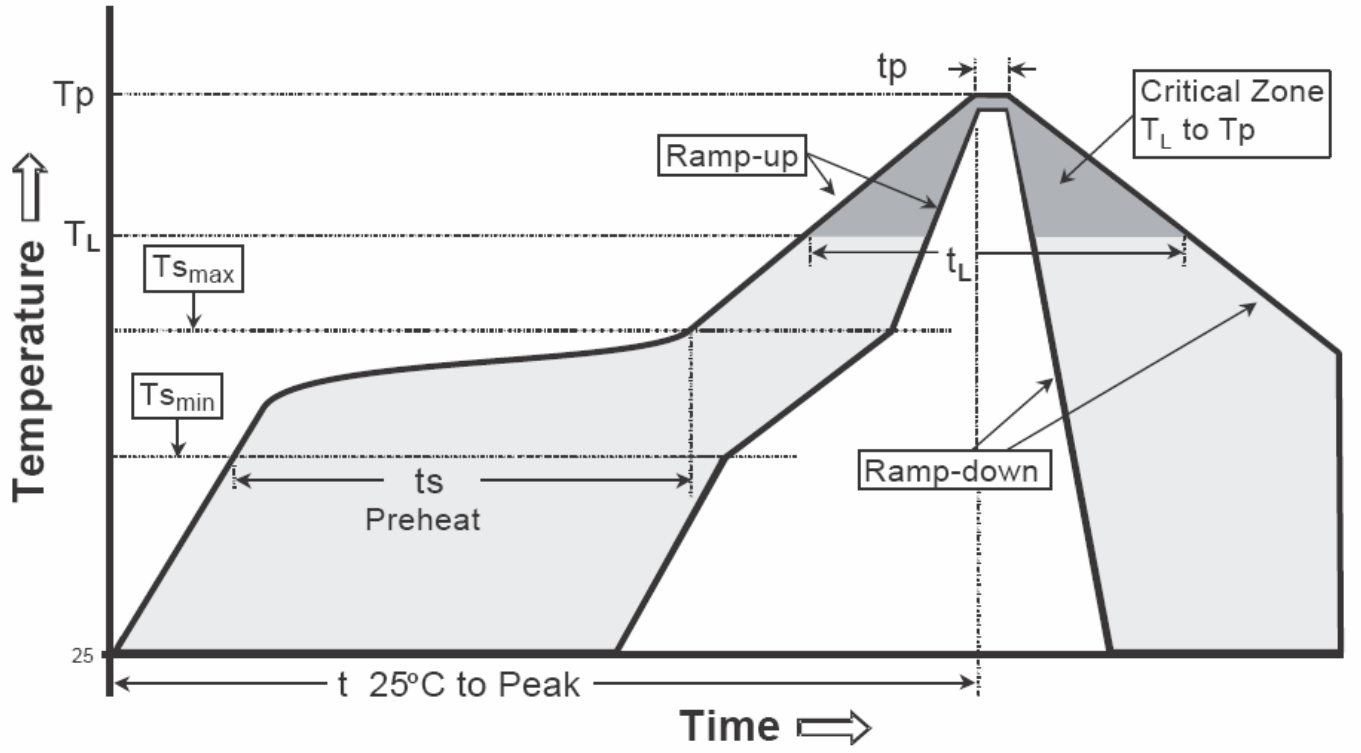
Symbol	Ao	Bo	Ko	Po	P1	P2	T
Spec	6.83±0.1	7.42±0.1	1.88±0.1	4.0±0.1	8.0±0.10	2.0±0.05	0.292±0.02
Symbol	E	F	Do	D1	W	10Po	
Spec	1.75±0.1	5.5±0.05	1.60±0.1	1.5±0.25	$12^{+0.3}_{-0.1}$	40.0±0.2	

Unit : mm

Recommended wave soldering condition

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

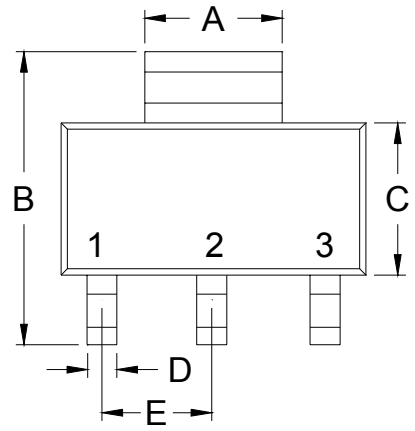
Recommended temperature profile for IR reflow

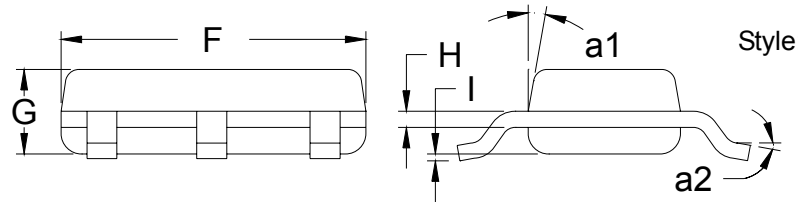


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

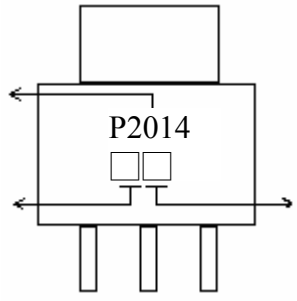
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-223 Dimension





Marking:



Device Name

Year Code:
5→2005, 6→2006,
7→2007,…,etc

Month Code:
1→Jan,2→Feb,3→Mar, …, 9→Sep, A→Oct, B→Nov, C→Dec

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

3-Lead SOT-223 Plastic Surface Mounted Package
CYStek Package Code: L3

*: 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