NPN Epitaxial Planar Transistor

BTC1510E3

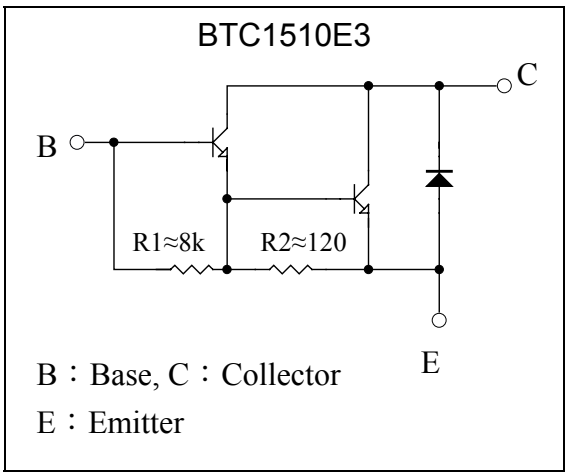
Description

The BTC1510E3 is a NPN Darlington transistor, designed for general purpose amplifier and low speed switching application.

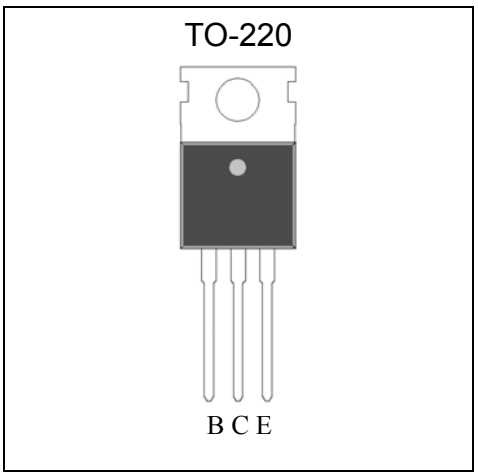
Features:

- High BV_{CEO}
- Low $V_{CE(SAT)}$
- High current gain
- Monolithic construction with built-in base-emitter shunt resistors
- Pb-free lead plating package

Equivalent Circuit

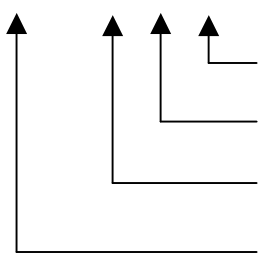


Outline



Ordering Information

Device	Package	Shipping
BTC1510E3-XX-UB-S	TO-220 (RoHS compliant package)	50 pcs/tube, 20 tubes/box, 4 boxes / carton



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, UB : 50 pcs / tube, 20 tubes/box

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	150	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	$I_{C(DC)}$	10	A
	$I_{C(Pulse)}$	15 *1	
Power Dissipation	Pd(T_A=25℃)	2	W
	Pd(T_C=25℃)	65	
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Note : *1. Single Pulse Pw=100ms

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	150	-	-	V	I_C=100μA, I_E=0
BV_{CEO}	150	-	-	V	I_C=1mA, I_B=0
I_{CEO}	-	-	200	μA	V_{CE}=150V, I_E=0
I_{CBO}	-	-	200	μA	V_{CB}=150V, I_E=0
I_{EBO}	-	-	2	mA	V_{EB}=5V, I_C=0
*$V_{CE(sat)}$ 1	-	-	1.5	V	I_C=5A, I_B=10mA
*$V_{CE(sat)}$ 2	-	-	3	V	I_C=10A, I_B=100mA
*$V_{CE(sat)}$ 3	-	-	2	V	I_C=5A, I_B=2.5mA
*$V_{BE(sat)}$	-	-	2	V	I_C=5A, I_B=5mA
*$V_{BE(on)}$ 1	-	-	2.8	V	V_{CE}=3V, I_C=5A
*$V_{BE(on)}$ 2	-	-	4.5	V	V_{CE}=3V, I_C=10A
*V_{FEC}	-	-	3	V	I_C=5A
*h_{FE} 1	2	-	20	K	V_{CE}=3V, I_C=5A
*h_{FE} 2	100	-	-	-	V_{CE}=3V, I_C=10A

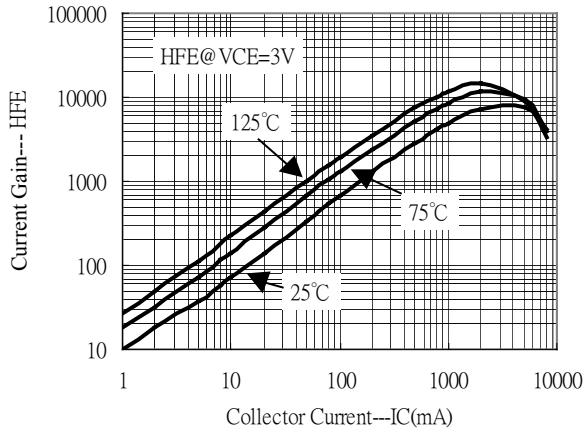
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

Classification Of $V_{CE(sat)}$ 1

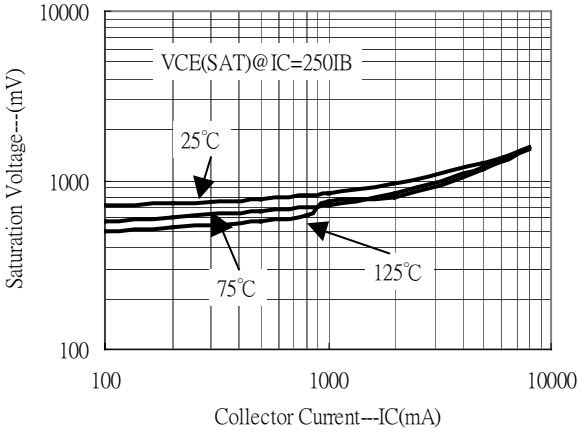
Rank	KA	N
Range	<1.1V	<1.5V

Typical Characteristics

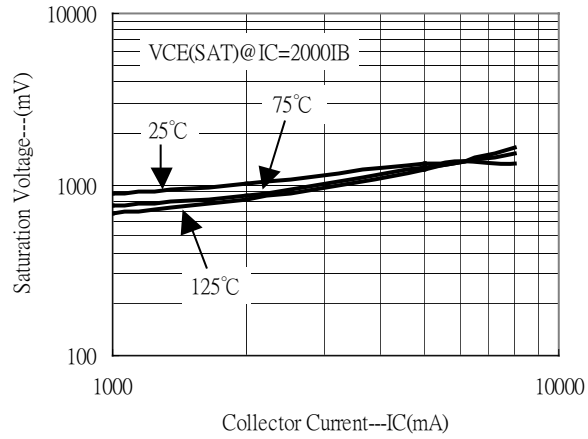
Current Gain vs Collector Current



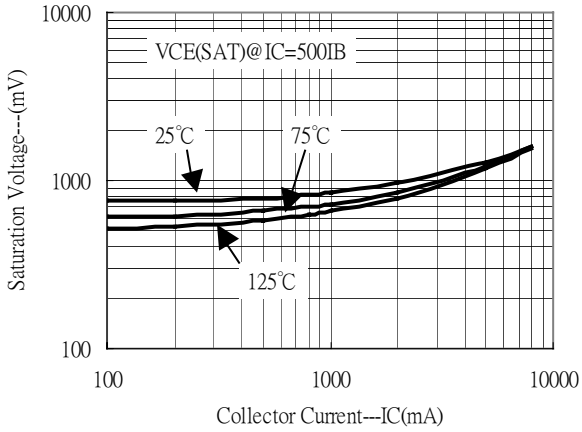
Saturation Voltage vs Collector Current



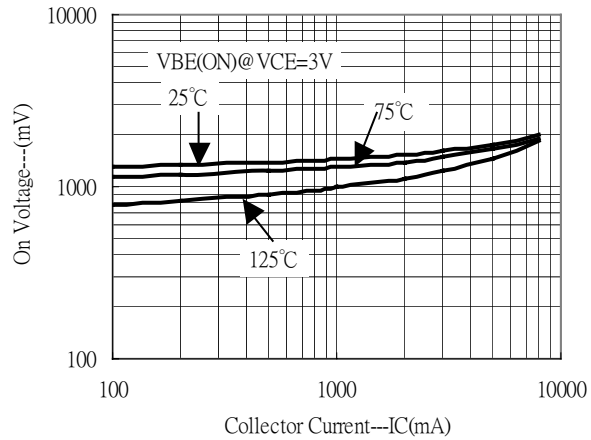
Saturation Voltage vs Collcetor Current



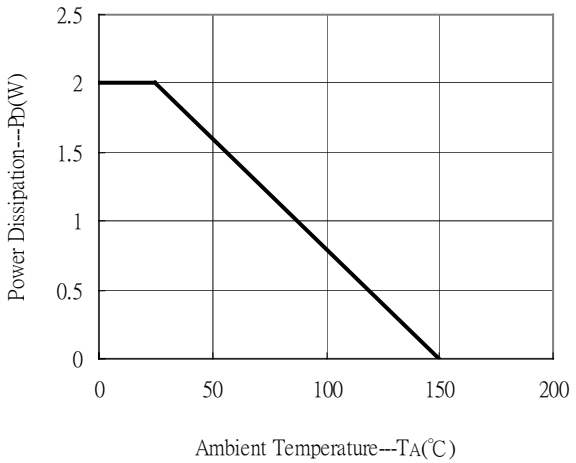
Saturation Voltage vs Colltctor Current



Saturation Voltage vs Collcetor Current

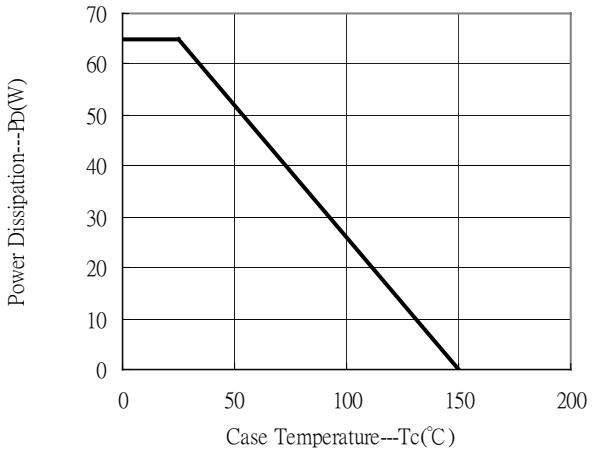


Power Derating Curve



Characteristic Curves(Cont.)

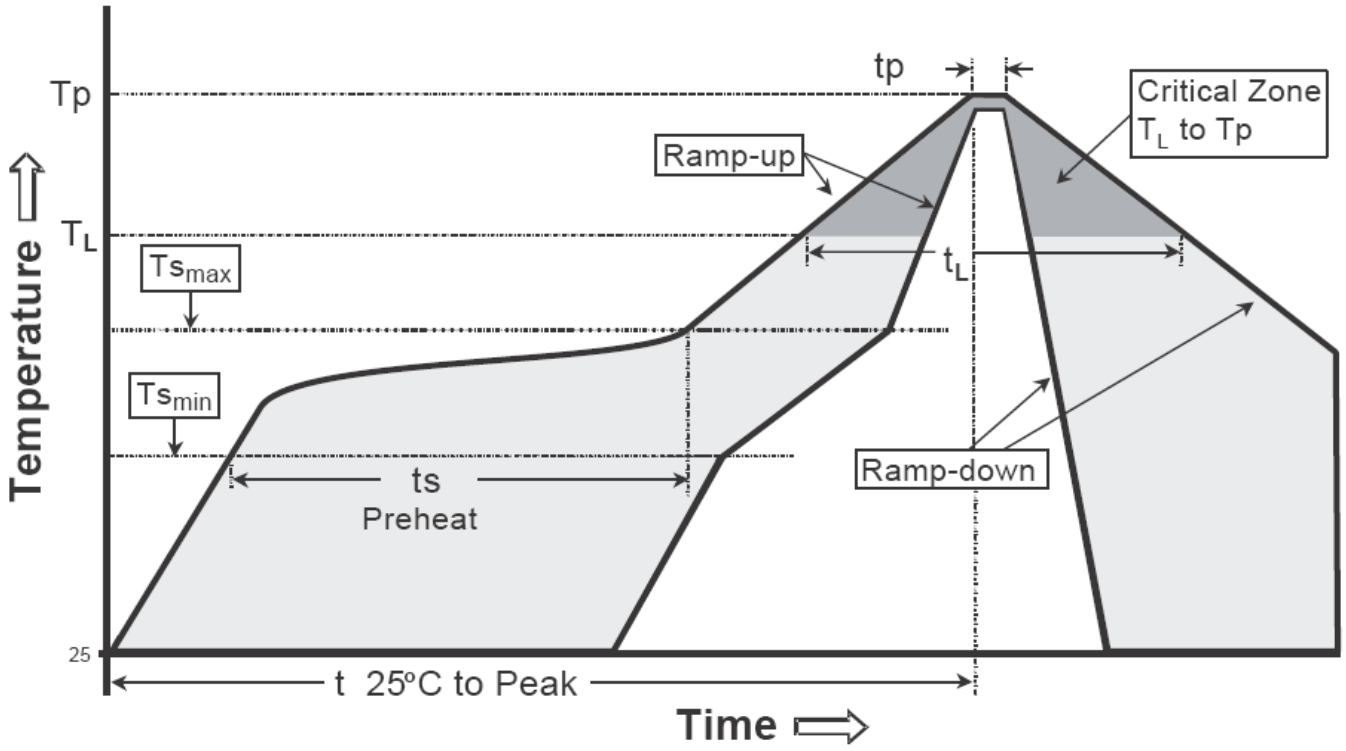
Power Derating Curve



Recommended wave soldering condition

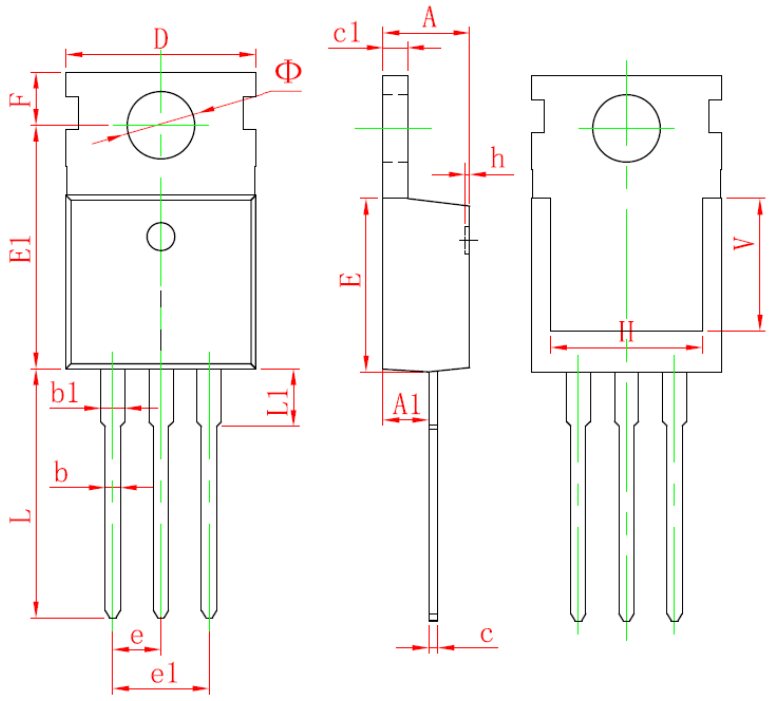
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow

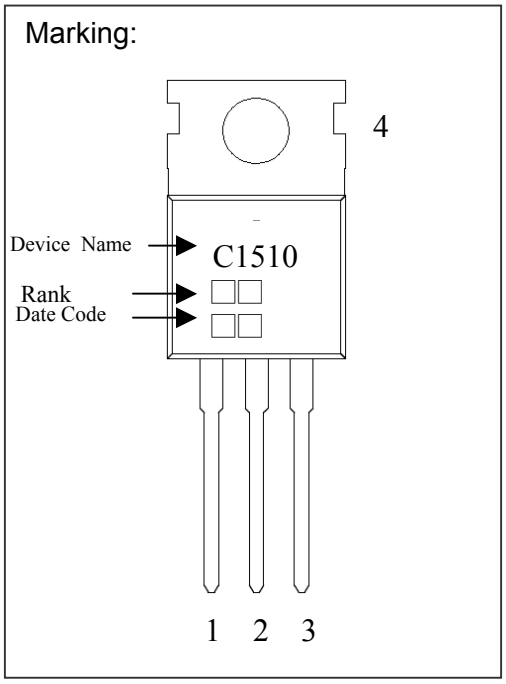


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

TO-220 Dimension



3-Lead TO-220 Plastic Package
CYStek Package Code: E3



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

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181	e	2.540*		0.100*	
A1	2.250	2.550	0.089	0.100	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	F	2.650	2.950	0.104	0.116
b1	1.170	1.370	0.046	0.054	H	7.900	8.100	0.311	0.319
c	0.330	0.650	0.013	0.026	h	0.000	0.300	0.000	0.012
c1	1.200	1.400	0.047	0.055	L	12.900	13.400	0.508	0.528
D	9.910	10.250	0.390	0.404	L1	2.850	3.250	0.112	0.128
E	8.950	9.750	0.352	0.384	V	7.500 REF		0.295 REF	
E1	12.650	12.950	0.498	0.510	Φ	3.400	3.800	0.134	0.150

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.