Low Saturation PNP Epitaxial Planar Transistor

BTB589N3

Description

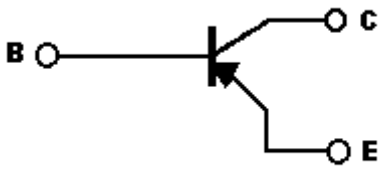
The BTB589N3 is designed with high current gain and low saturation voltage with collector current up to 1A continuous.

Features

- Low $V_{CE(SAT)}$, $V_{CE(SAT)} \leq$ -0.3V (I_C / I_B=-1A/-100mA)
- Large collector current, I_C=-1A
- Pb-free lead plating and halogen-free package

Symbol

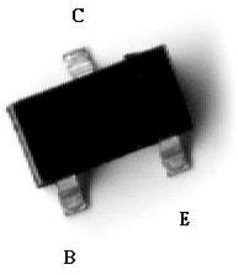
BTB589N3



B：Base
C：Collector
E：Emitter

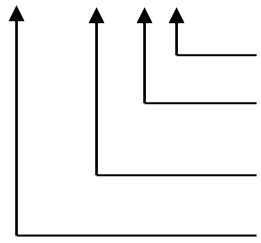
Outline

SOT-23



Ordering Information

Device	Package	Shipping
BTB589N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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

Packing spec, T1 :3000 pcs/tape & reel, 7” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-32	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current (DC)	I_C	-1	A
Collector Current (Pulse)	I_{CP}	-2	
Power Dissipation	P_D	310 (Note 1)	mW
		500 (Note 2)	
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-ambient, max	$R_{\theta JA}$	403 (Note 1)	°C/W
		250 (Note 2)	

Note: 1.Device mounted on FR-4 PCB with minimum pad
2.Device mounted on FR-4 PCB with area of 4.5"×5", mounting pad 0.02 in^2 of 2 oz copper

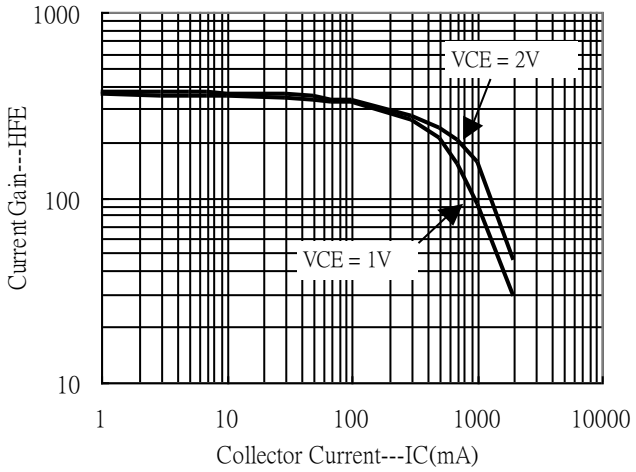
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-40	-	-	V	I_C=-50μA
BV_{CEO}	-32	-	-	V	I_C=-1mA
BV_{EBO}	-5	-	-	V	I_E=-50μA
I_{CBO}	-	-	-100	nA	V_{CB}=-30V
I_{EBO}	-	-	-100	nA	V_{EB}=-4V
*$V_{CE(sat)}$ 1	-	-	-0.25	V	I_C=-500mA, I_B=-50mA
*$V_{CE(sat)}$ 2	-	-	-0.30	V	I_C=-1A, I_B=-100mA
*$V_{CE(sat)}$ 3	-	-	-0.65	V	I_C=-2A, I_B=-200mA
*$V_{BE(sat)}$	-	-	-1.2	V	I_C=-1A, I_B=-100mA
*$V_{BE(on)}$	-	-	-1.1	V	V_{CE}=-2V, I_C=-1A
*h_{FE} 1	180	-	420	-	V_{CE}=-3V, I_C=-100mA
*h_{FE} 2	100	-	-	-	V_{CE}=-2V, I_C=-500mA
*h_{FE} 3	80	-	-	-	V_{CE}=-2V, I_C=-1A
*h_{FE} 4	30	-	-	-	V_{CE}=-2V, I_C=-2A
f_T	100	200	-	MHz	V_{CE}=-5V, I_C=-50mA, f=100MHz
Cob	-	12	25	pF	V_{CB}=-10V, f=1MHz

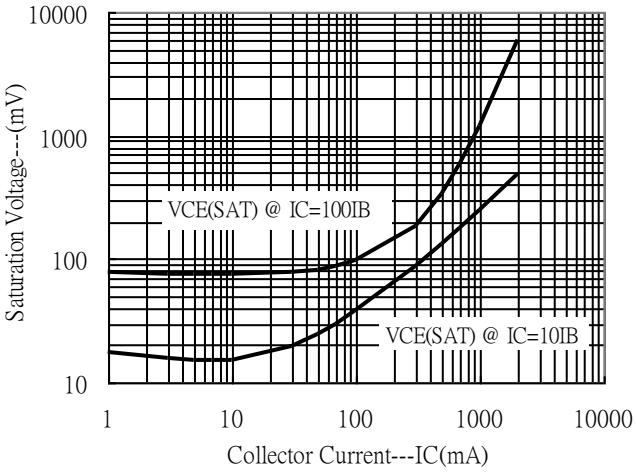
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

Typical Characteristics

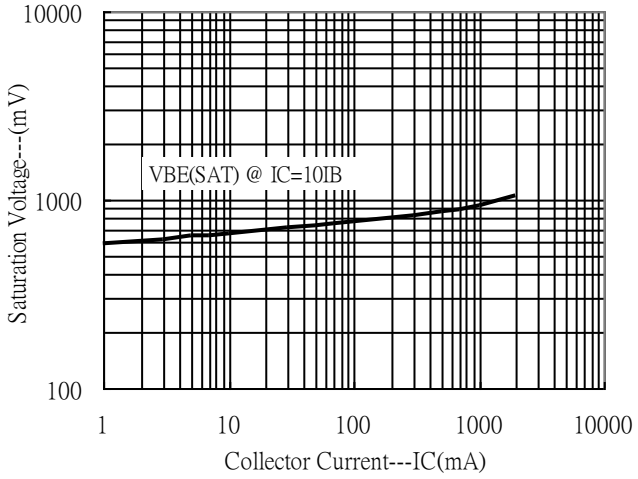
Current Gain vs Collector Current



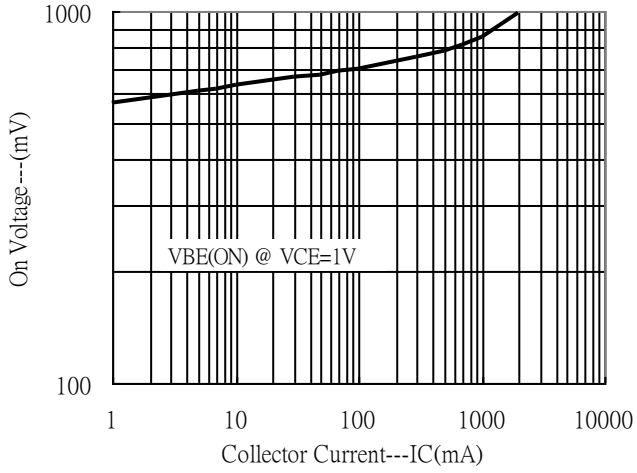
Saturation Voltage vs Collector Current



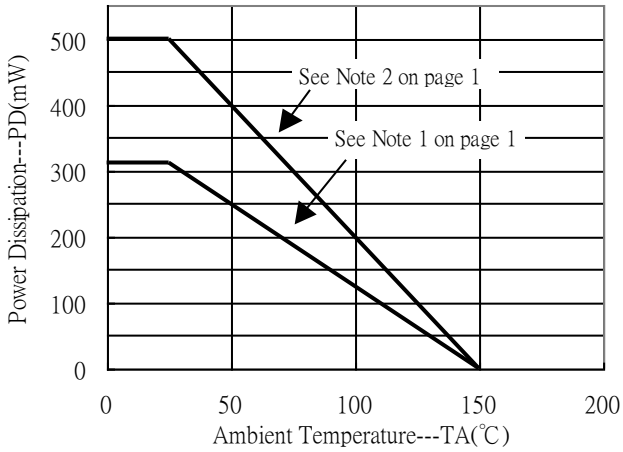
Saturation Voltage vs Collector Current



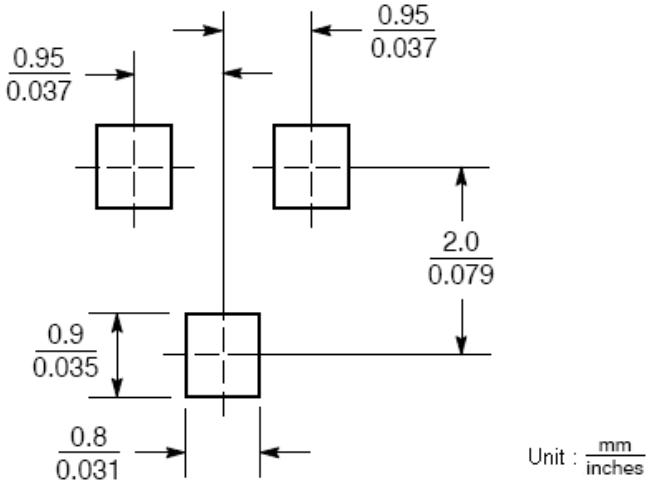
On Voltage vs Collector Current



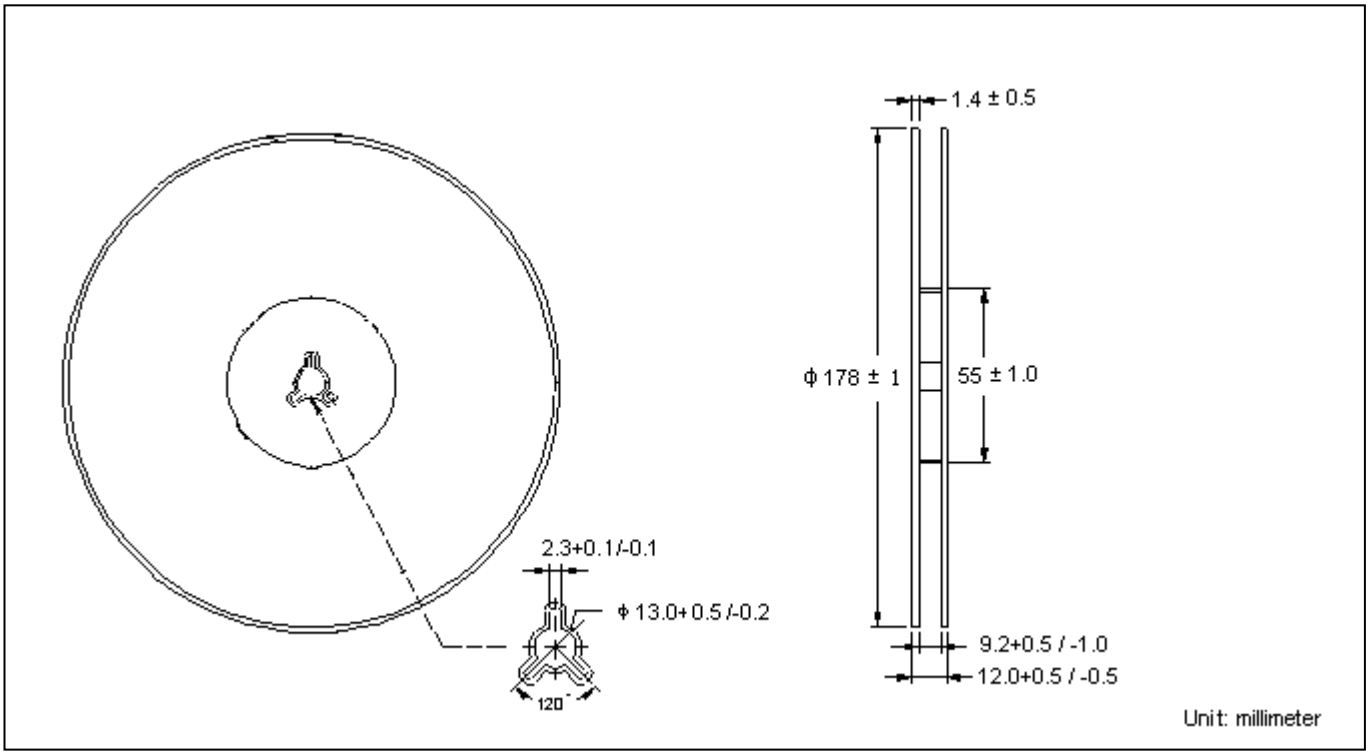
Power Derating Curves



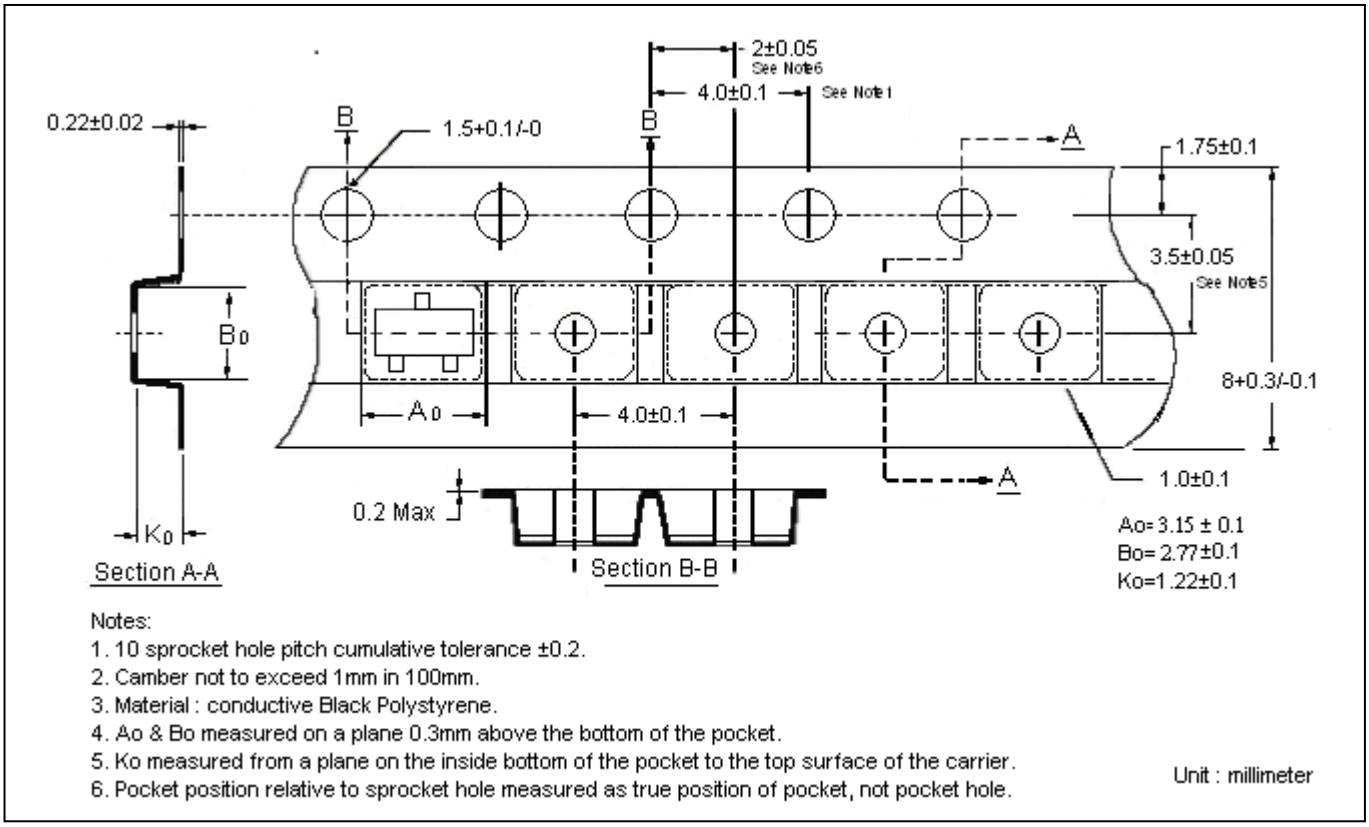
Recommended Soldering Footprint



Reel Dimension



Carrier Tape Dimension



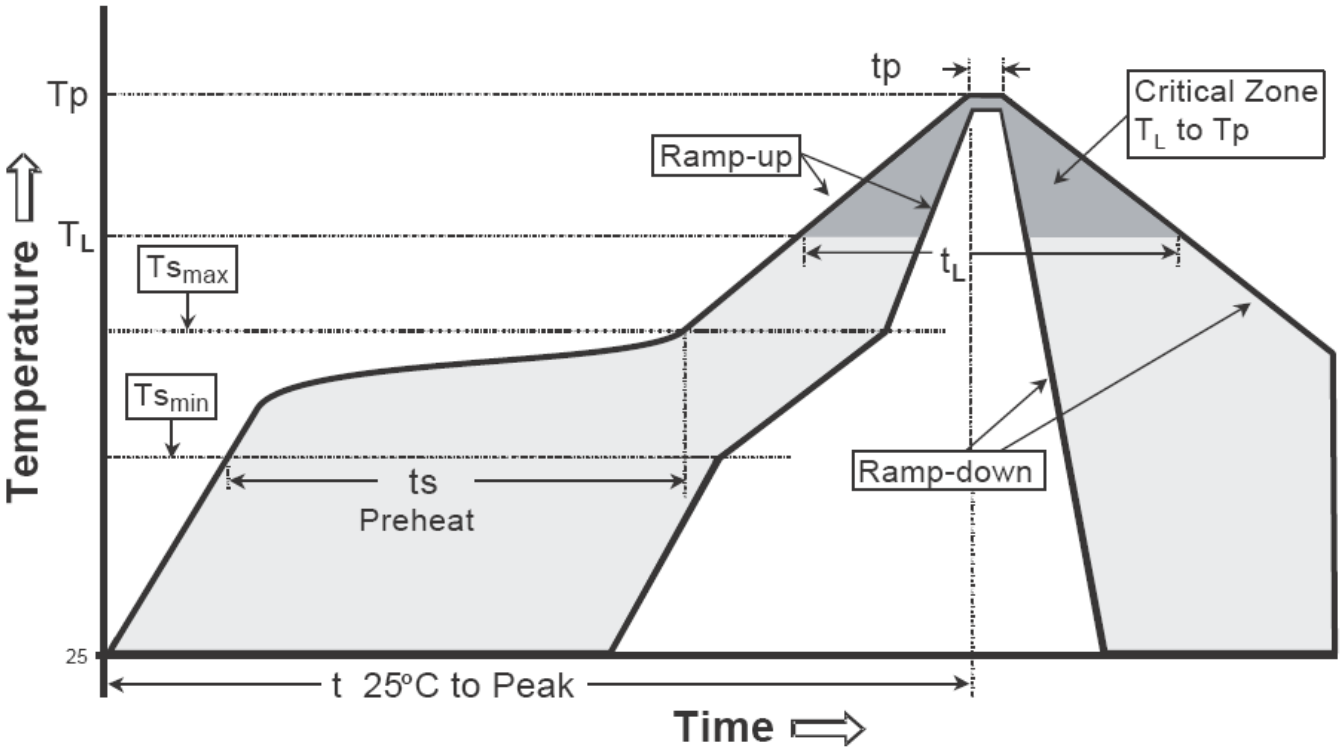
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

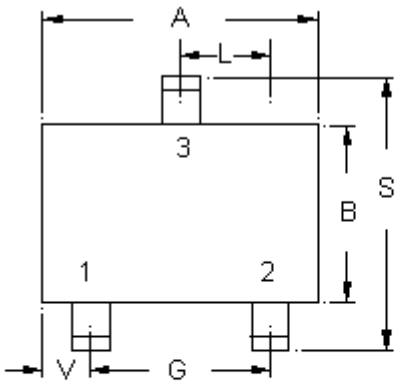
Recommended temperature profile for IR reflow

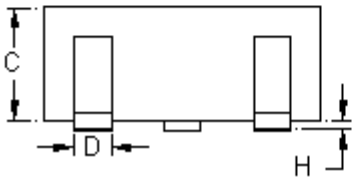


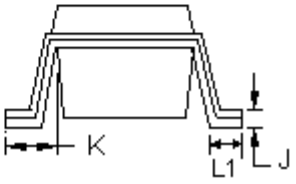
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − 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-23 Dimension

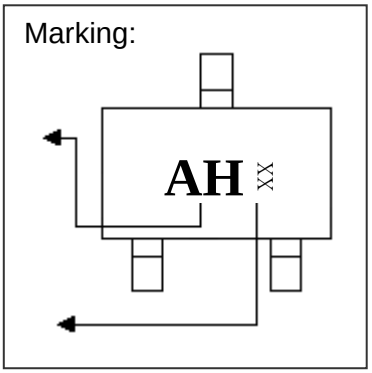






Device Code

Date Code



3-Lead SOT-23 Plastic
Surface Mounted Package
CYStek Package Code: N3

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

*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0551	1.20	1.40	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1004	2.10	2.55
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

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.