

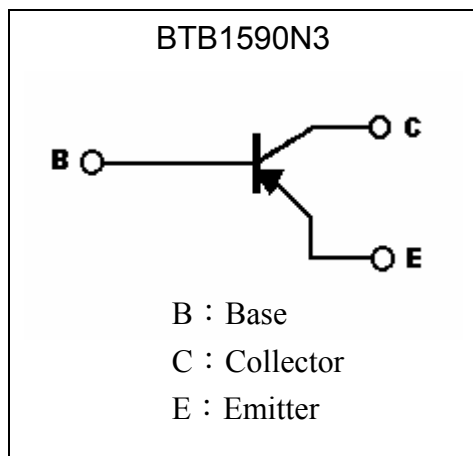
Low $V_{CE(SAT)}$ PNP Epitaxial Planar Transistor

BTB1590N3

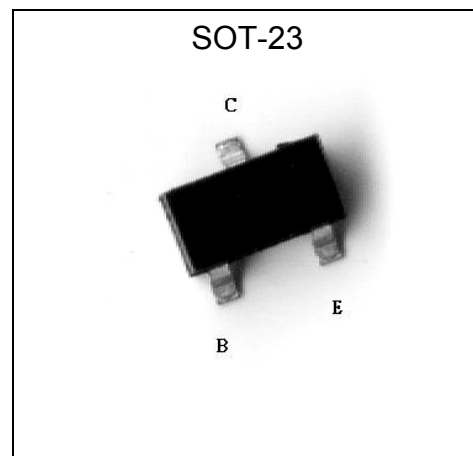
Features

- Low $V_{CE(SAT)}$, $V_{CE(SAT)}=-0.21V$ (typically) at $I_C=-500mA/I_B=-50mA$.
- Complementary to BTB2444N3.
- Pb-free lead plating and halogen-free package

Symbol

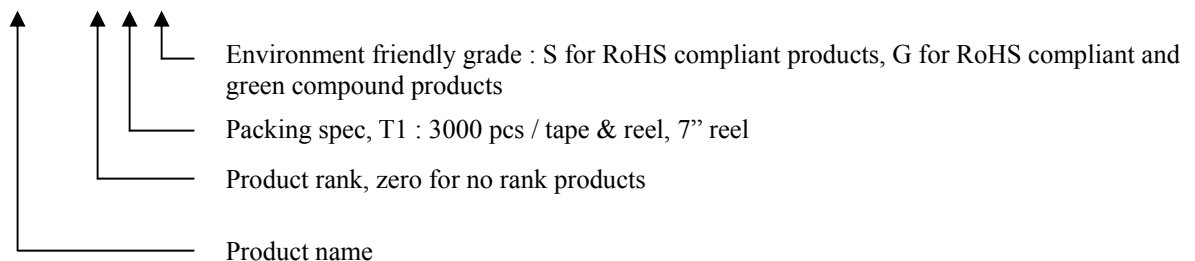


Outline



Ordering Information

Device	Package	Shipping
BTB1590N3-X-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel





Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-25	V
Emitter-Base Voltage	V _{EBO}	-6	V
Collector Current (DC)	I _C	-1.5	A
Collector Current (Pulse)	I _{CP}	-3 (Note)	A
Power Dissipation	P _d	225	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	556	°C/W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55~+150	°C

Note : Single pulse, Pw=10ms

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV _{CB0}	-40	-	-	V	I _C =-50μA, I _E =0
BV _{CEO}	-25	-	-	V	I _C =-1mA, I _B =0
BV _{EBO}	-6	-	-	V	I _E =-50μA, I _C =0
I _{CB0}	-	-	-100	nA	V _{CB} =-35V, I _E =0
I _{EBO}	-	-	-100	nA	V _{EB} =-6V, I _C =0
*V _{CE(sat) 1}	-	-	-0.3	V	I _C =-400mA, I _B =-20mA
*V _{CE(sat) 2}	-	-0.21	-0.4	V	I _C =-500mA, I _B =-50mA
*V _{CE(sat) 3}	-	-	-0.5	V	I _C =-800mA, I _B =-80mA
V _{BE(ON)}	-	-	-1	V	V _{CE} =-1V, I _C =-10mA
*h _{FE 1}	120	-	560	-	V _{CE} =-3V, I _C =-100mA
*h _{FE 2}	80	-	-	-	V _{CE} =-3V, I _C =-800mA
f _T	-	270	-	MHz	V _{CE} =-5V, I _C =-50mA, f=100MHz
C _{ob}	-	12	-	pF	V _{CB} =-10V, f=1MHz

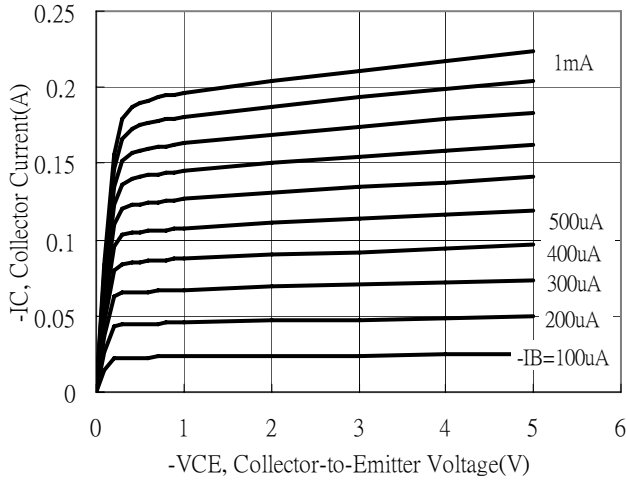
*Pulse Test: Pulse Width ≤380μs, Duty Cycles ≤2%

Classification Of h_{FE 1}

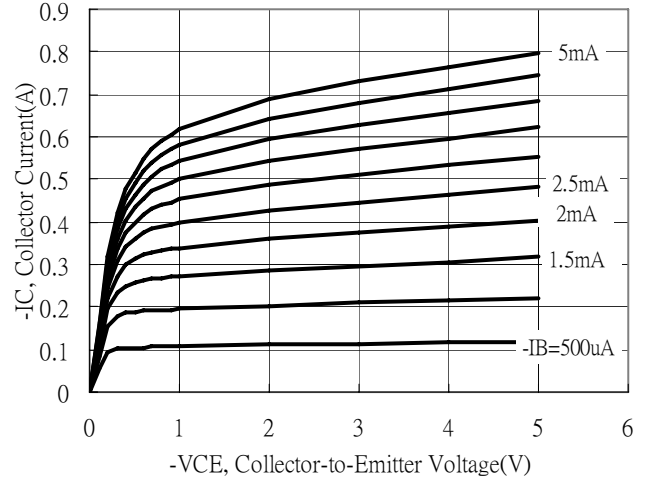
Rank	Q	R	S
Range	120~270	180~390	270~560

Typical Characteristics

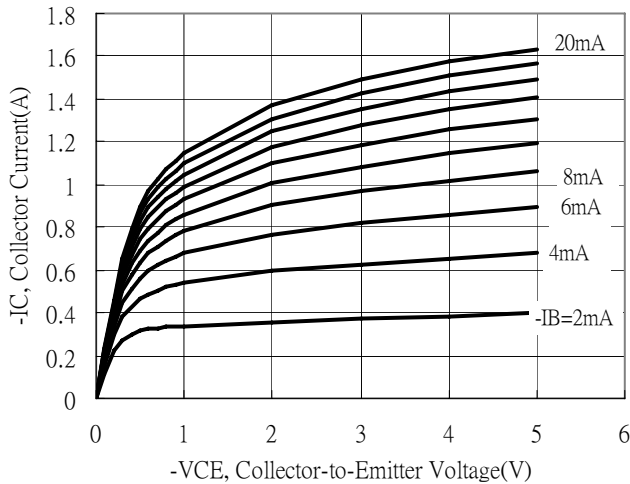
Emitter Grounded Output Characteristics



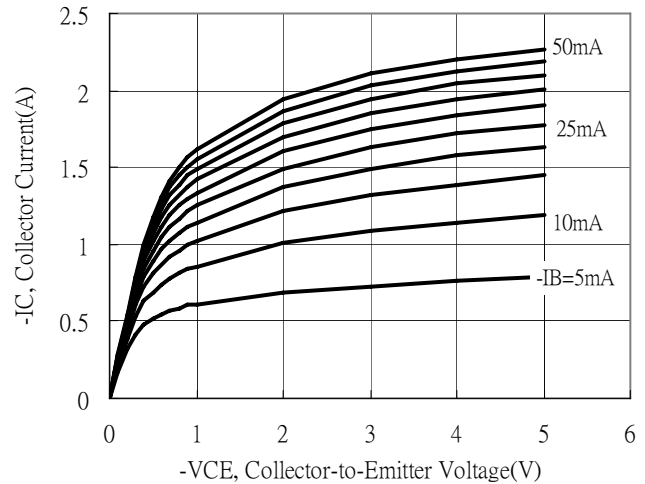
Emitter Grounded Output Characteristics



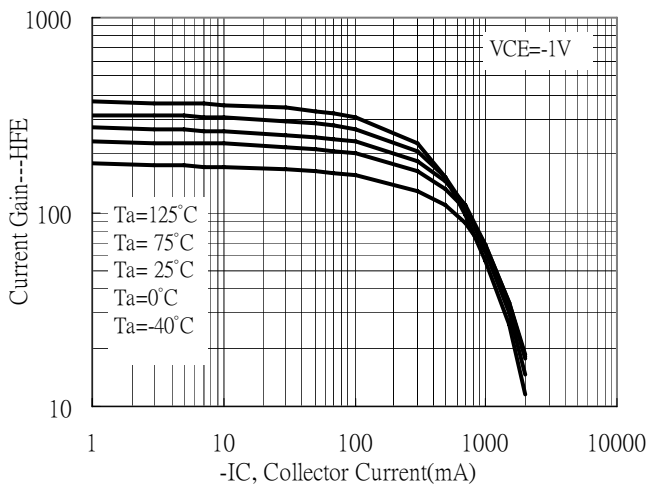
Emitter Grounded Output Characteristics



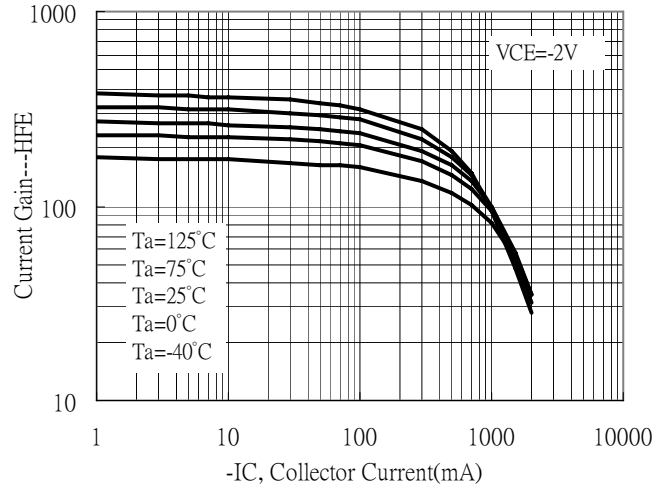
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

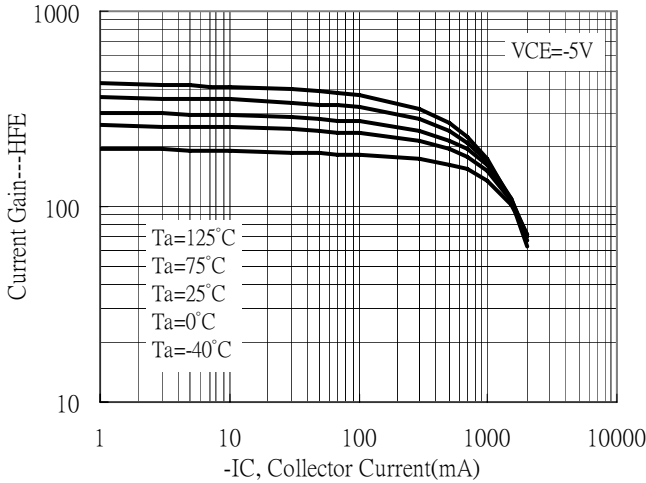


Current Gain vs Collector Current

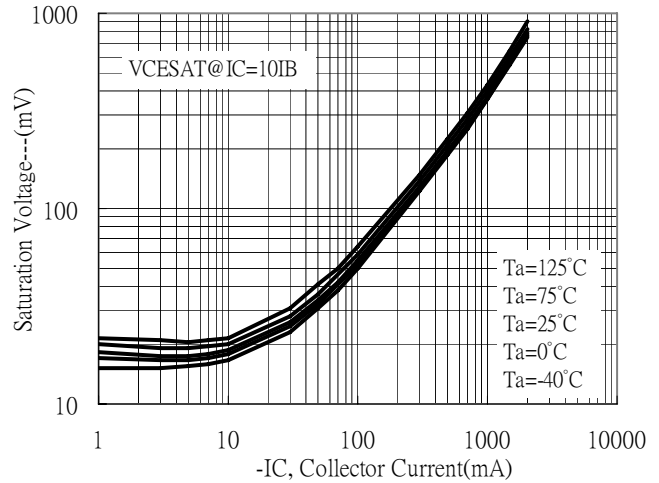


Typical Characteristics(Cont.)

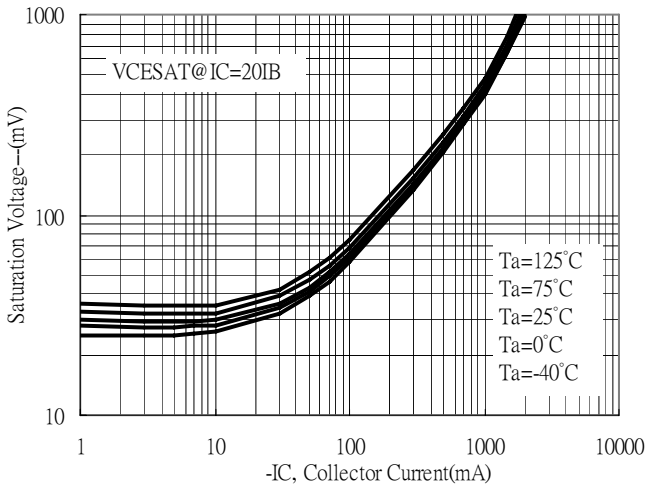
Current Gain vs Collector Current



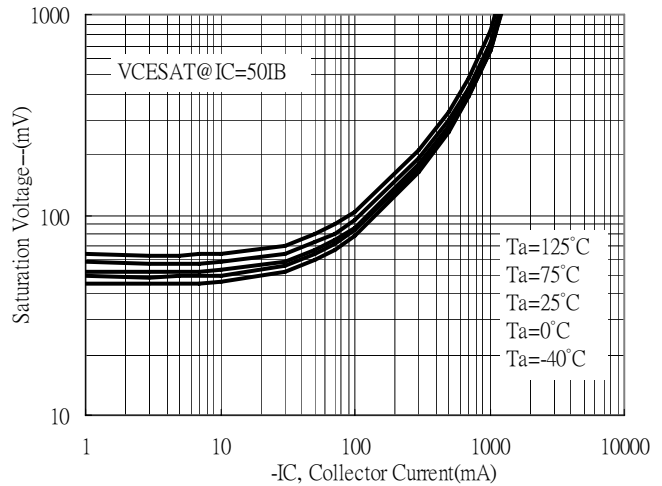
Saturation Voltage vs Collector Current



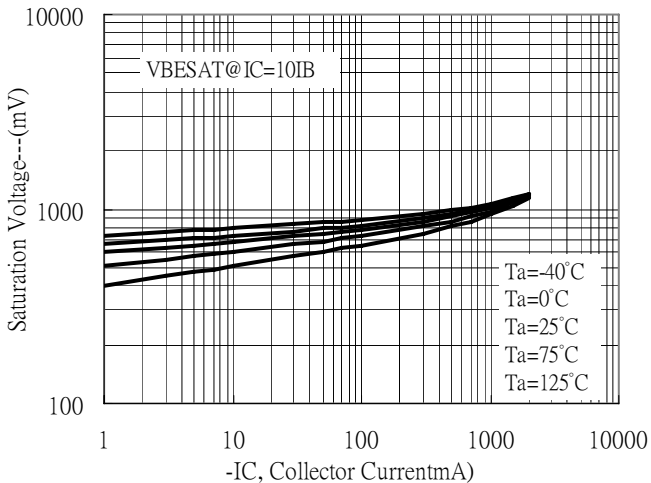
Saturation Voltage vs Collector Current



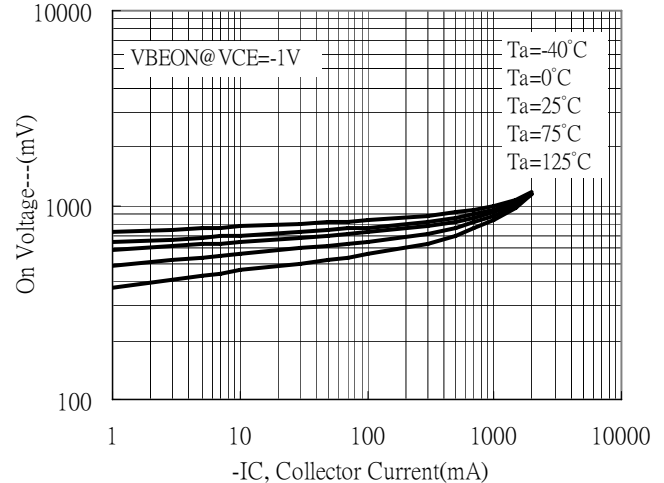
Saturation Voltage vs Collector Current



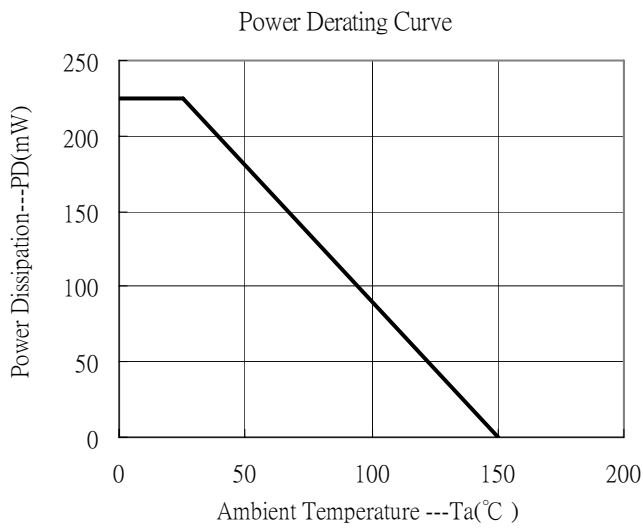
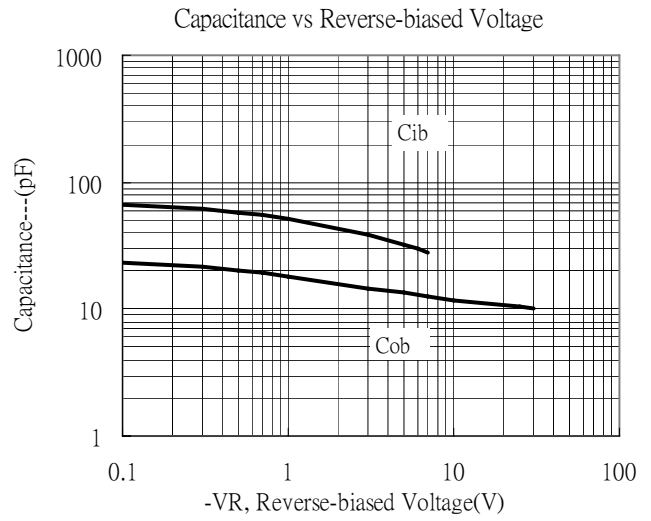
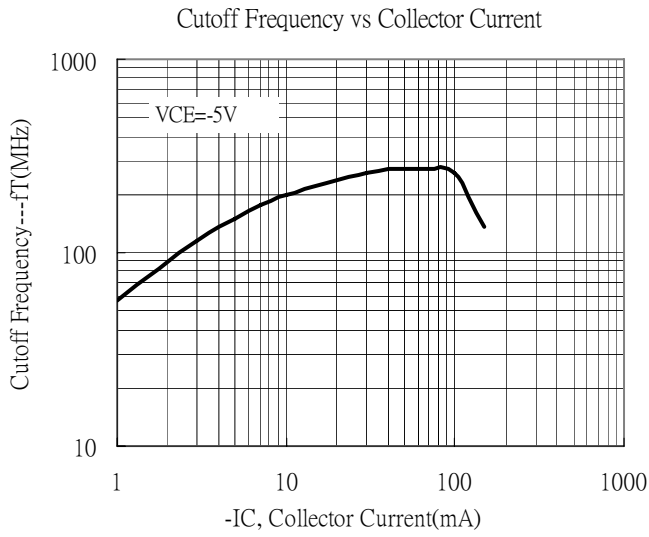
Saturation Voltage vs Collector Current



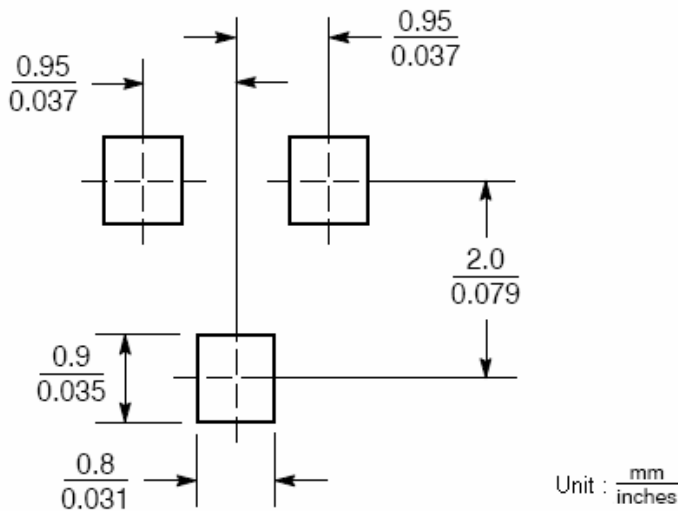
On Voltage vs Collector Current



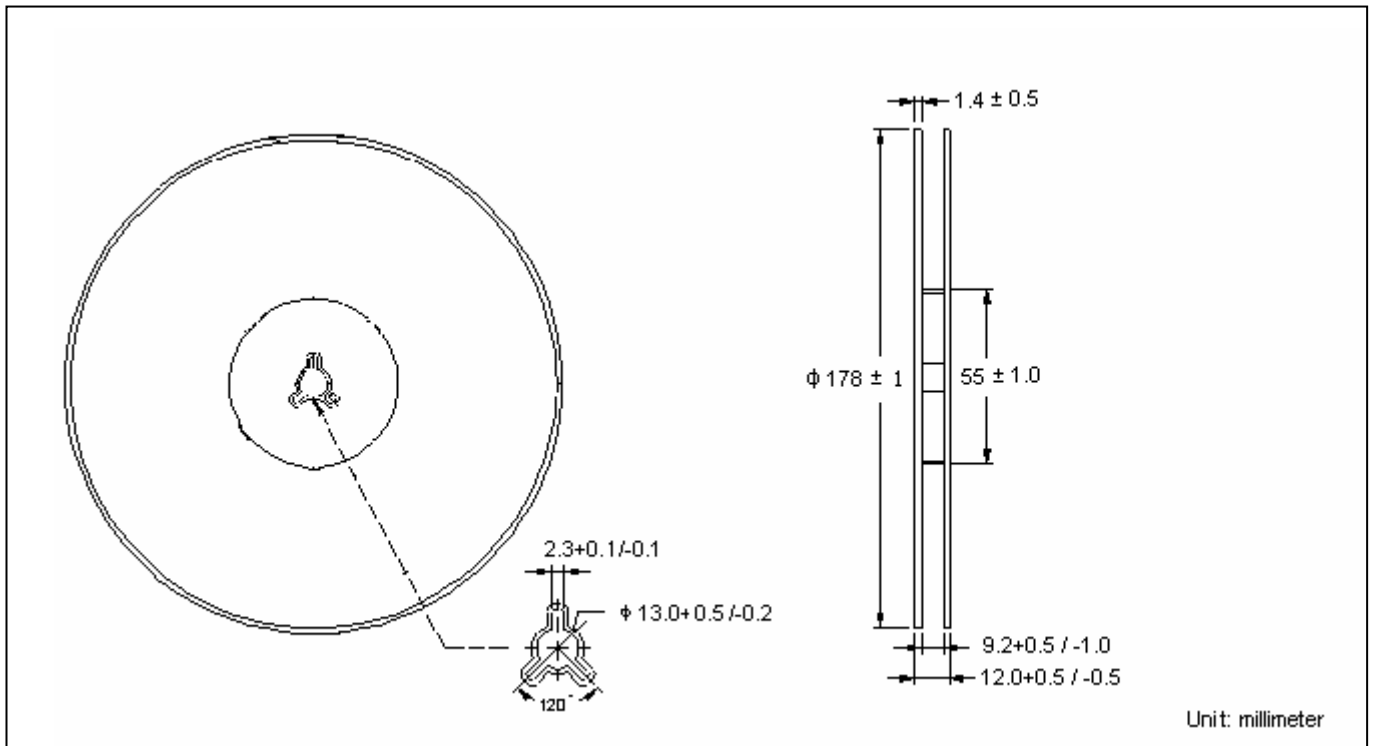
Typical Characteristics(Cont.)



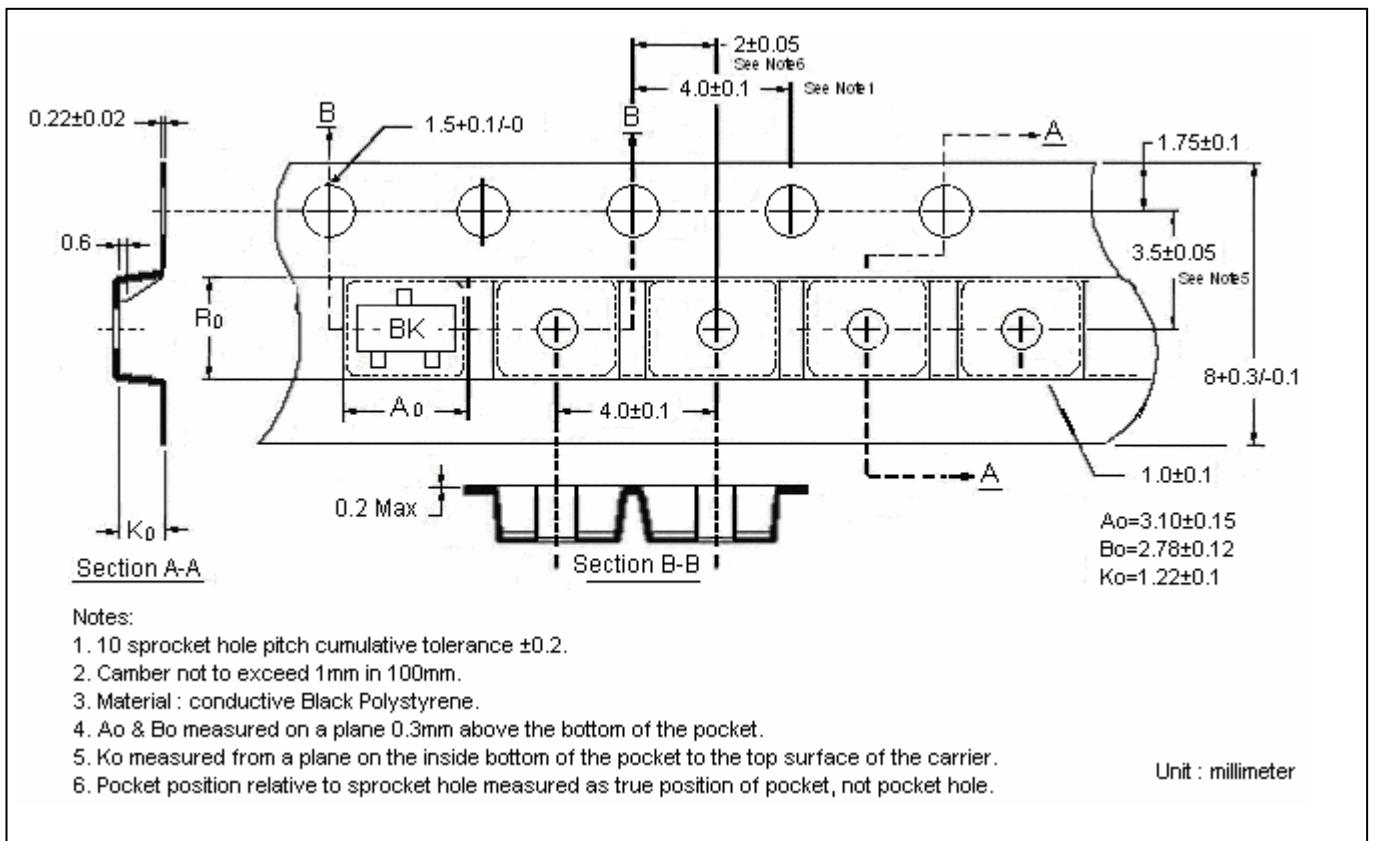
Recommended Soldering Footprint



Reel Dimension



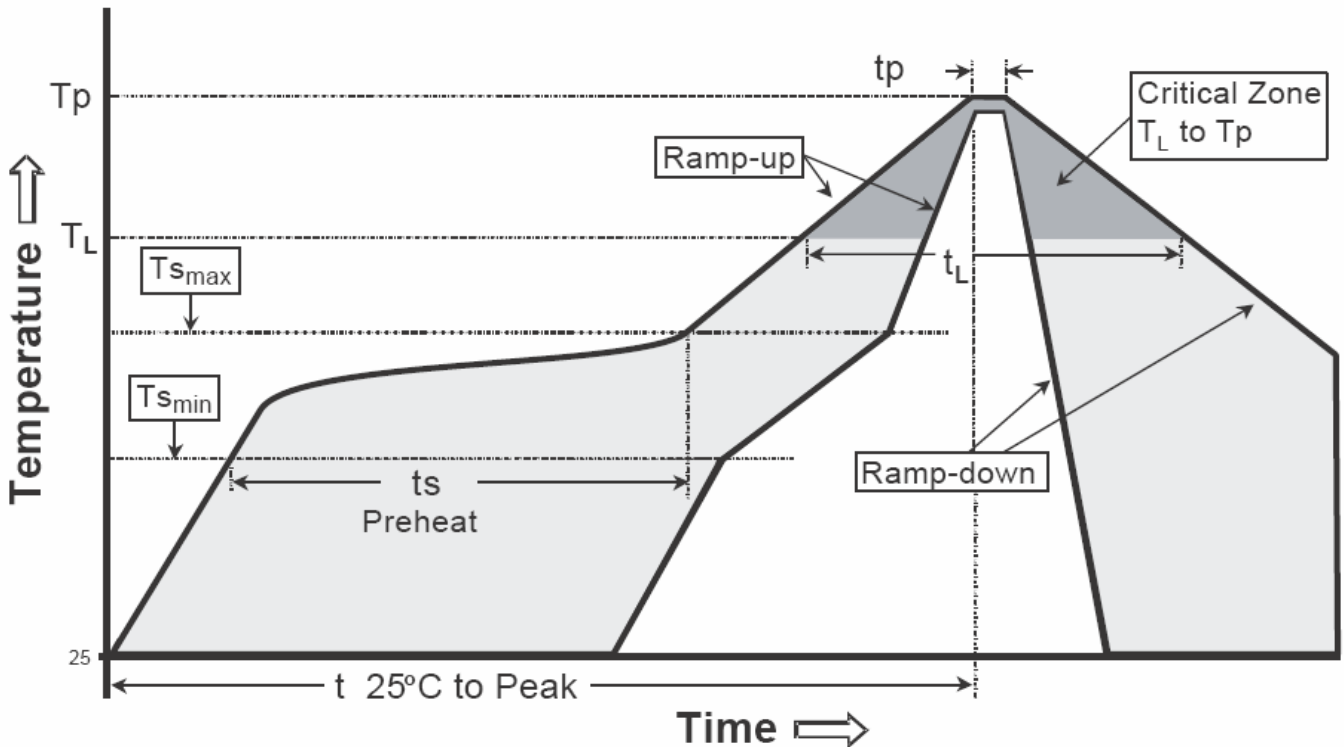
Carrier Tape Dimension



Recommended wave soldering condition

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

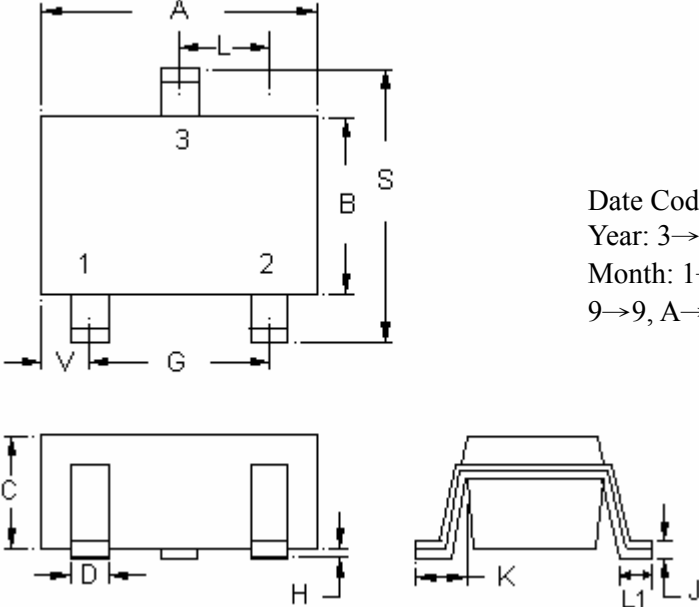
Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T _{s min})	100°C	150°C
-Temperature Max(T _{s max})	150°C	200°C
-Time(t _{s min} to t _{s max})	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	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-23 Dimension

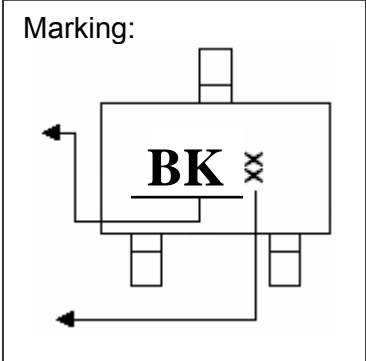


The diagram shows three views of the SOT-23 package: a top view with dimensions A, L, B, S, 1, 2, 3, V, and G; a side view with dimensions C, D, H, and J; and a perspective view with dimensions K, L1, and L2. The top view labels 1, 2, and 3 correspond to Pin 1, Base, and Collector respectively.

Marking:

Product Code

Date Code: Year+Month
 Year: 3→2003, 4→2004
 Month: 1→1, 2→2, . . .
 9→9, A→10, B→11, C→12



The marking diagram shows a rectangular package with three leads. The top lead is labeled 'BK' with a small 'X' to its right. Arrows point to the top and bottom leads.

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

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

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	0.0669	1.20	1.70	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	0.1161	2.10	2.95
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

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