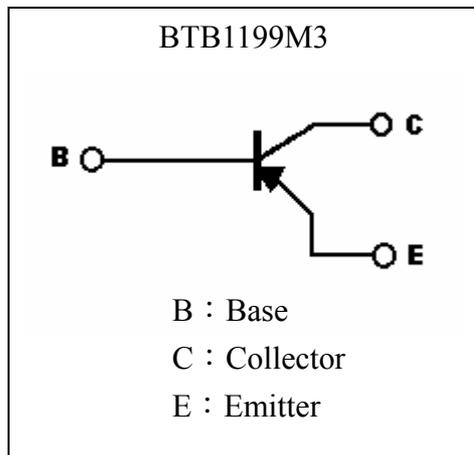
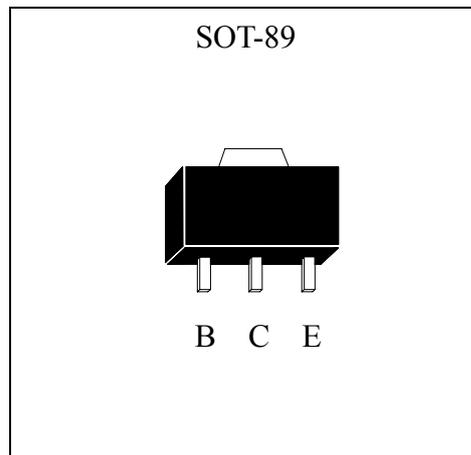


**Low Vcesat PNP Epitaxial Planar Transistor**

# BTB1199M3

**Features**

- Low  $V_{CE(sat)}$ ,  $V_{CE(sat)} = -0.24V$  (typical), at  $I_C / I_B = -500mA / -20mA$
- Pb-free package

**Symbol**

**Outline**

**Absolute Maximum Ratings** ( $T_a = 25^\circ C$ )

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	$V_{CBO}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-25	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Collector Current(DC)	$I_C$	-2	A
Peak Collector Current	$I_{CM}$	-4	A
Peak Base Current	$I_{BM}$	-200	mA
Power Dissipation	Pd	0.6	W
		1 *2	
		2 *3	
Junction Temperature	$T_j$	150	$^\circ C$
Storage Temperature	$T_{stg}$	-55~+150	$^\circ C$

 Note : \*1 Single pulse,  $P_w = 10ms$ 

 \*2 When mounted on FR-4 PCB with area measuring  $10 \times 10 \times 1$  mm

 \*3 When mounted on ceramic with area measuring  $40 \times 40 \times 1$  mm

**Characteristics (Ta=25°C)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CB0</sub>	-40	-	-	V	I <sub>C</sub> =-50μA, I <sub>E</sub> =0
BV <sub>CE0</sub>	-25	-	-	V	I <sub>C</sub> =-1mA, I <sub>B</sub> =0
BV <sub>EBO</sub>	-5	-	-	V	I <sub>E</sub> =-50μA, I <sub>C</sub> =0
I <sub>CB0</sub>	-	-	-100	nA	V <sub>CB</sub> =-40V, I <sub>E</sub> =0
I <sub>EBO</sub>	-	-	-100	nA	V <sub>EB</sub> =-5V, I <sub>C</sub> =0
*V <sub>CE(sat)</sub>	-	-0.24	-0.4	V	I <sub>C</sub> =-500mA, I <sub>B</sub> =-20mA
*V <sub>BE(on)</sub>	-0.5	-	-0.8	V	V <sub>CE</sub> =-1V, I <sub>C</sub> =-10mA
*h <sub>FE 1</sub>	120	-	390	-	V <sub>CE</sub> =-1V, I <sub>C</sub> =-100mA
*h <sub>FE 2</sub>	40	-	-	-	V <sub>CE</sub> =-1V, I <sub>C</sub> =-700mA
f <sub>T</sub>	-	120	-	MHz	V <sub>CE</sub> =-5V, I <sub>C</sub> =-10mA, f=100MHz
Cob	-	19	-	pF	V <sub>CB</sub> =-10V, f=1MHz

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

**Classification of hFE 1**

Rank	Q	R
Range	120~270	180~390

**Ordering Information**

Device	Package	Shipping	Marking
BTB1199M3	SOT-89 (Pb-free)	1000 pcs / Tape & Reel	BA

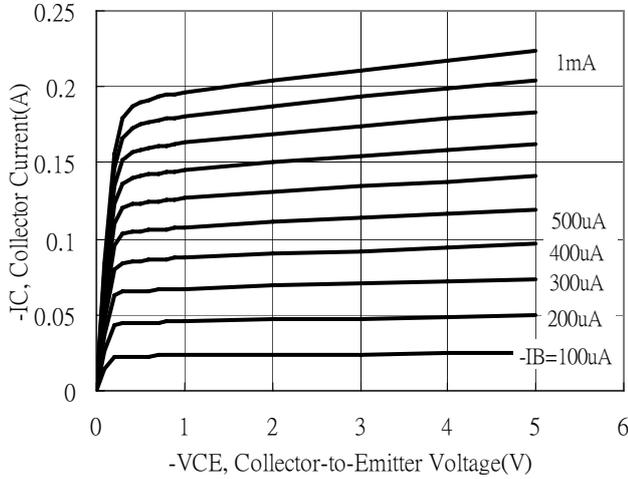
**Recommended Storage Condition:**

Temperature : ≤ 30 °C

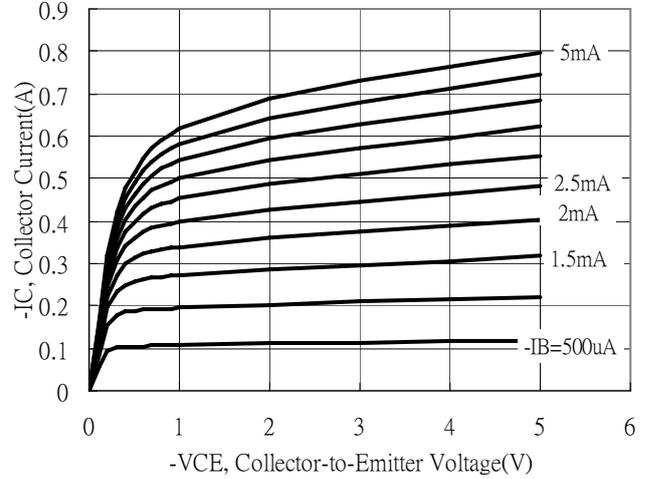
Humidity : ≤ 60% RH

**Typical Characteristics**

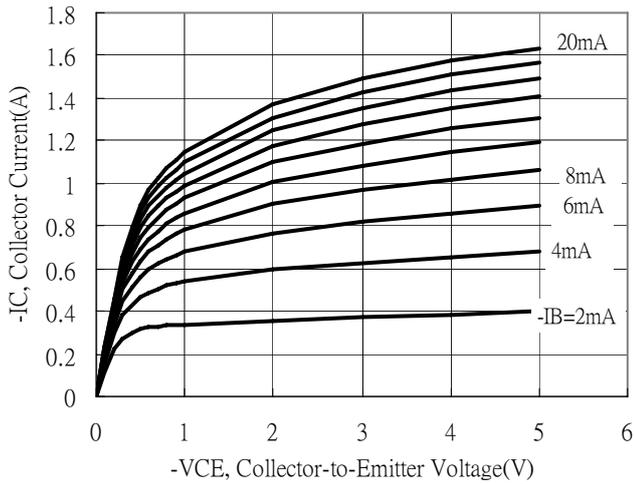
Emitter Grounded Output Characteristics



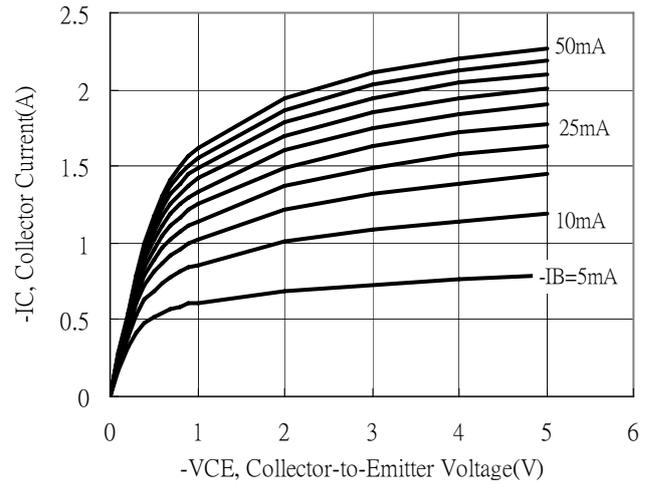
Emitter Grounded Output Characteristics



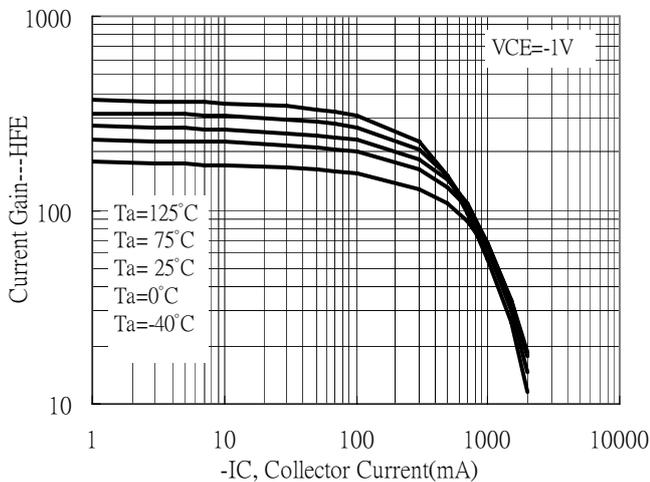
Emitter Grounded Output Characteristics



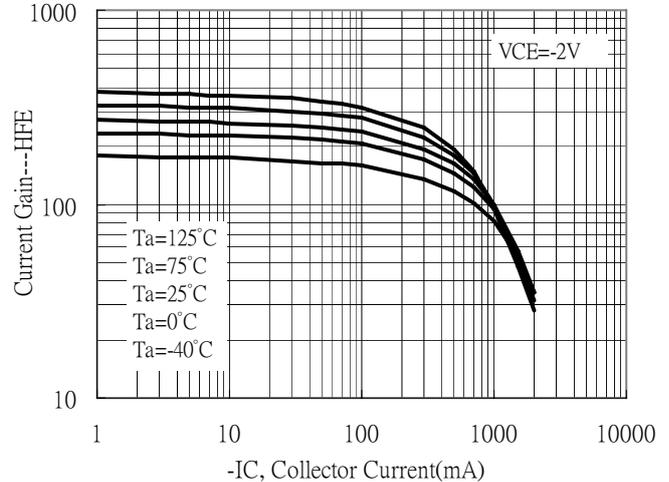
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

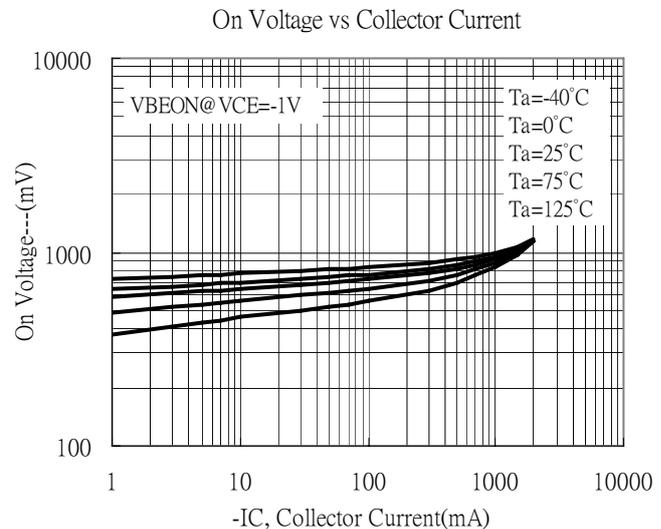
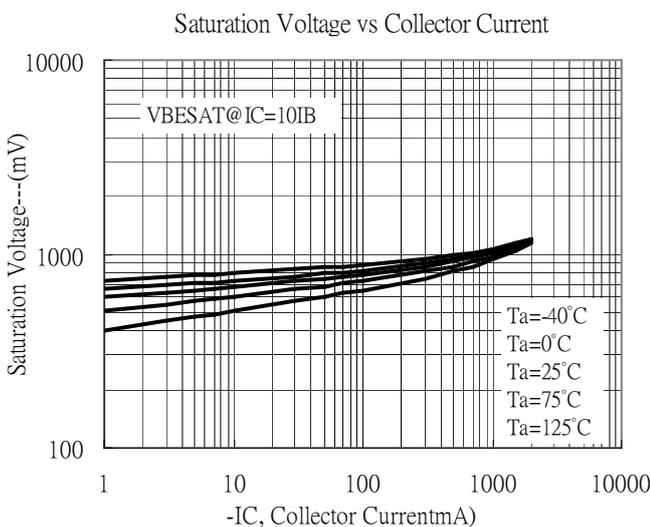
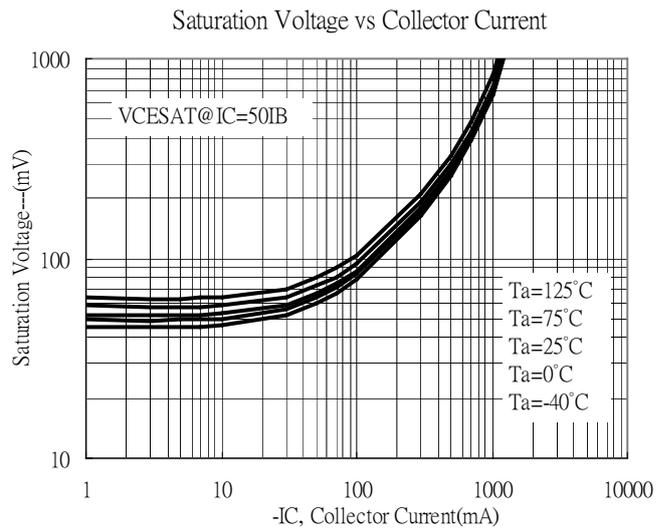
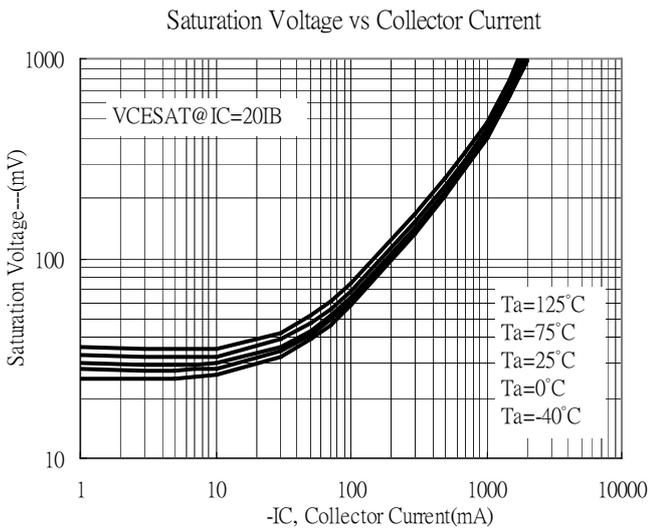
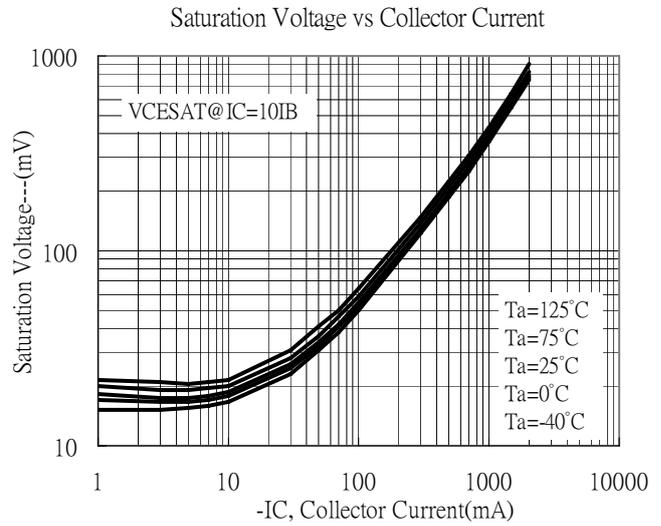
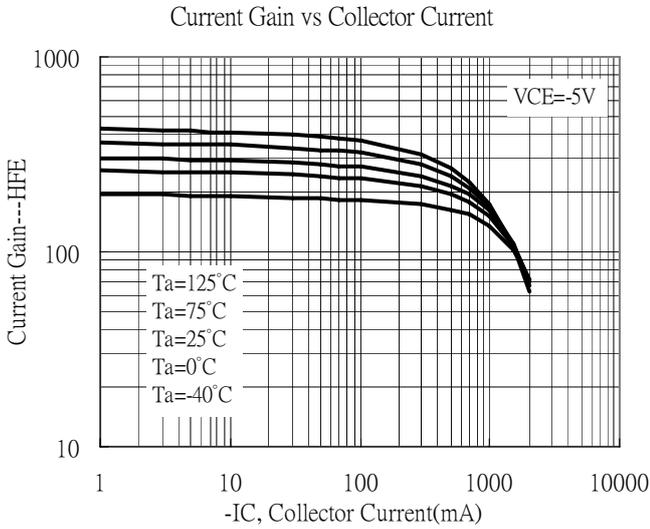


Current Gain vs Collector Current

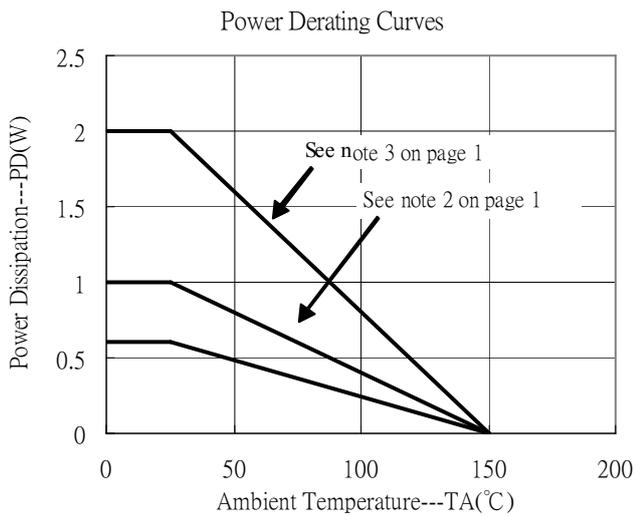
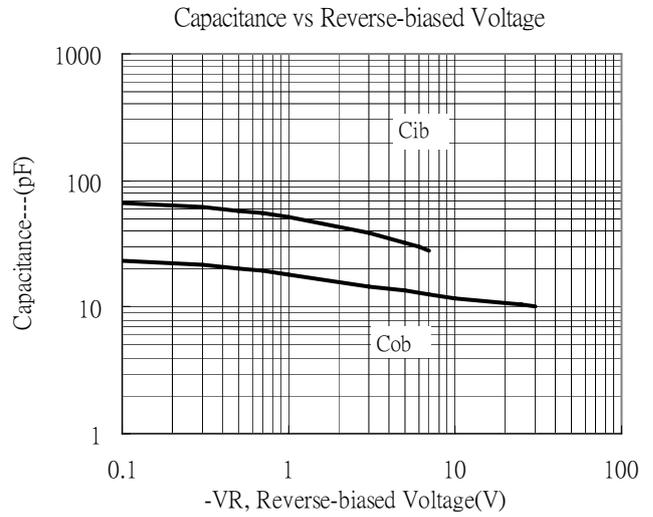
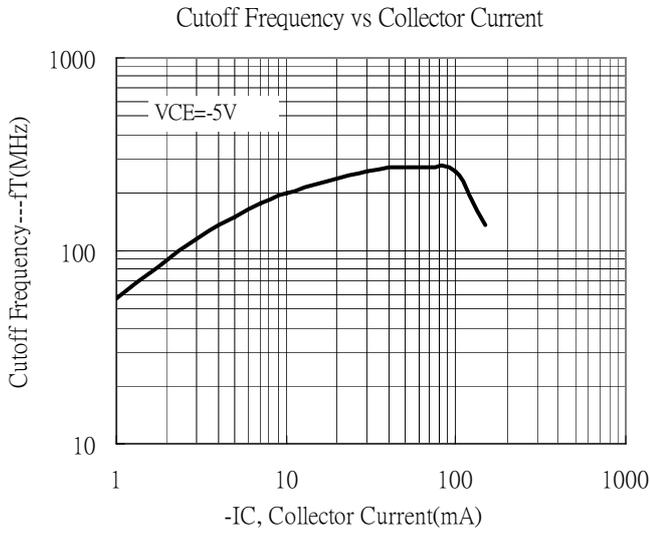




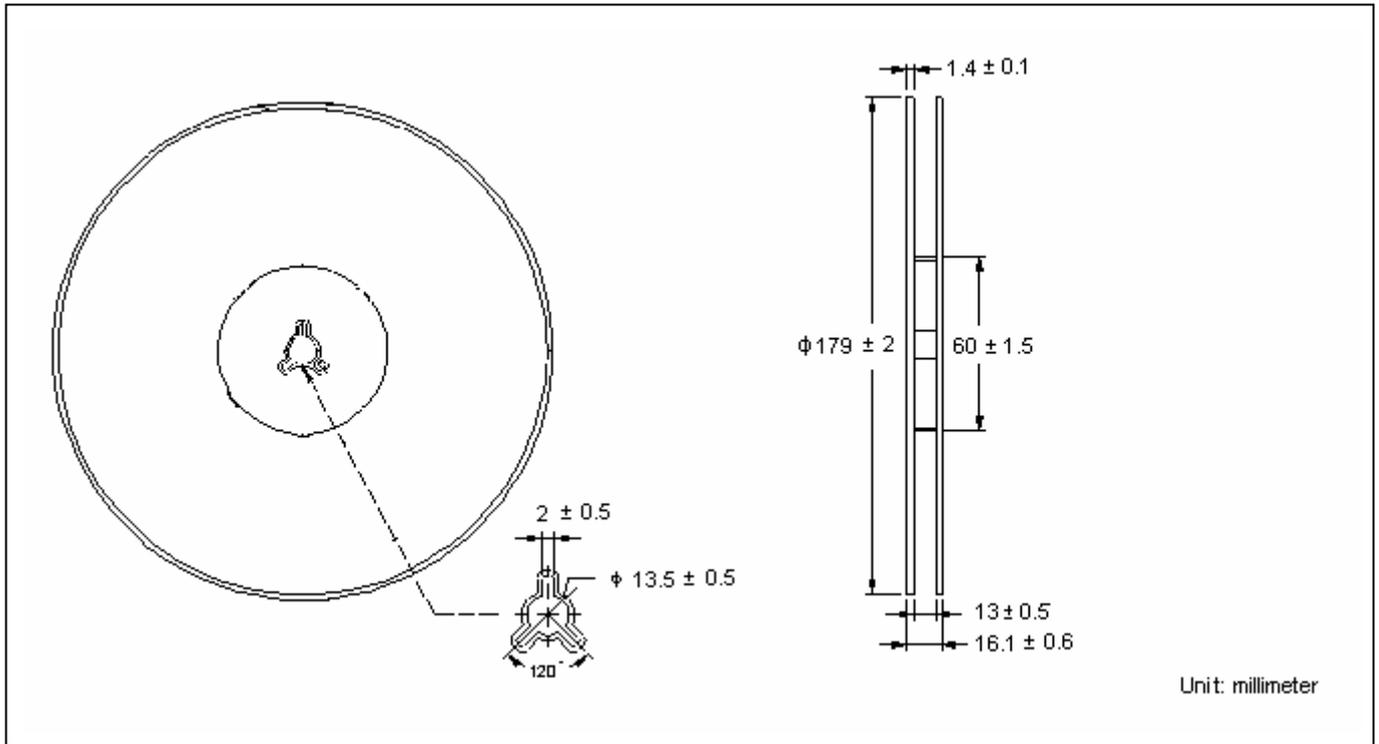
### Typical Characteristics(Cont.)



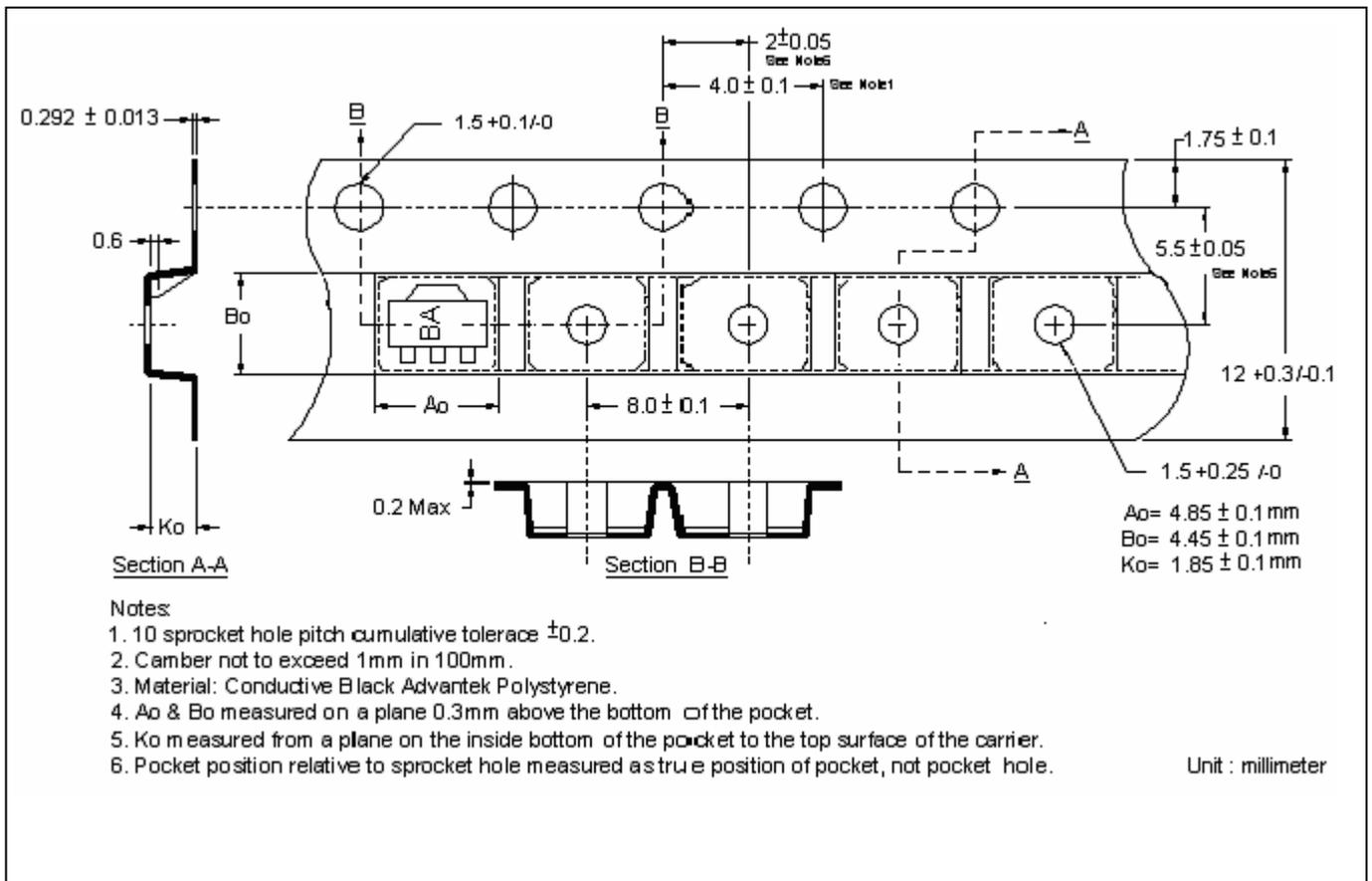
**Typical Characteristics(Cont.)**



**Reel Dimension**



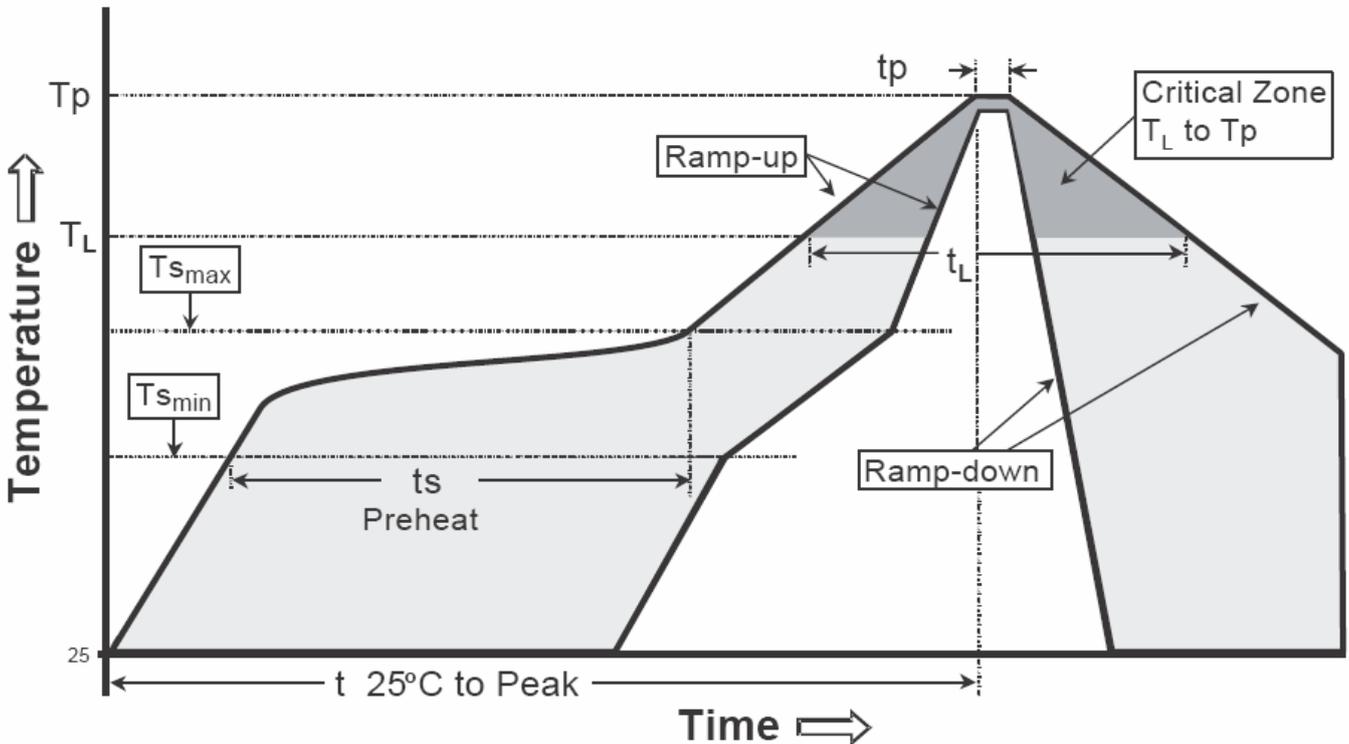
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

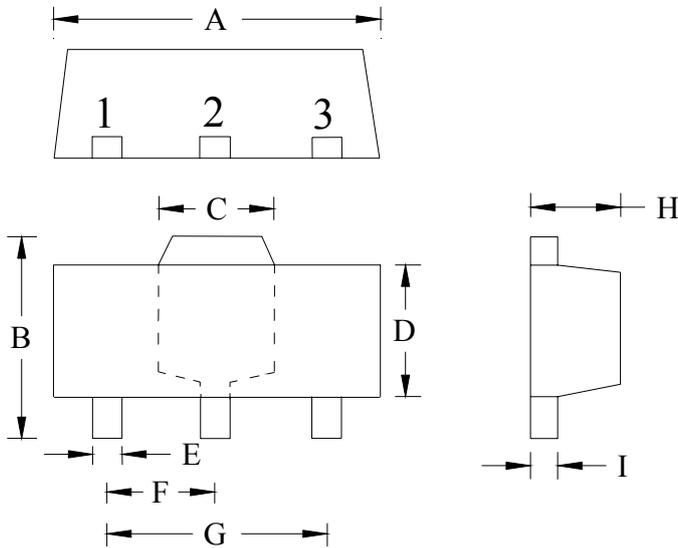
**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	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.

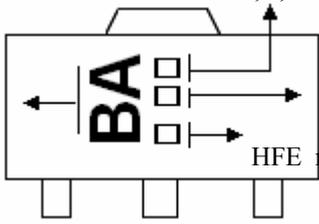
Note : All temperatures refer to topside of the package, measured on the package body surface.

**SOT-89 Dimension**



The diagram shows three views of the SOT-89 package: a top view with dimensions A, B, C, D, E, F, and G; a side view with dimensions H and I; and a perspective view with dimensions A, B, C, D, E, F, G, H, and I. The top view shows three pins labeled 1, 2, and 3.

**Marking:**



month code: 1~9, A,B,C  
 Year code : 6→2006, 7→2007, ...  
 Product Code BA  
 HFE rank

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

3-Lead SOT-89 Plastic  
 Surface Mounted Package  
 CYStek Package Code: M3

\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0591	TYP	1.50	TYP
B	0.1551	0.1673	3.94	4.25	G	0.1181	TYP	3.00	TYP
C	0.0610	REF	1.55	REF	H	0.0551	0.0630	0.0551	0.0630
D	0.0906	0.1024	2.30	2.60	I	0.0138	0.0173	0.0138	0.0173
E	0.0126	0.0205	0.32	0.52					

**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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