

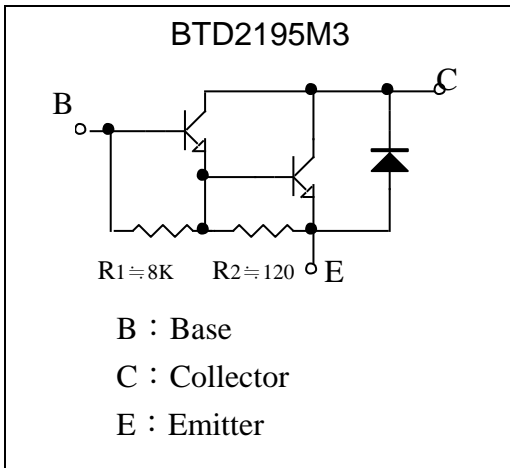
# NPN Epitaxial Planar Transistor

## BTD2195M3

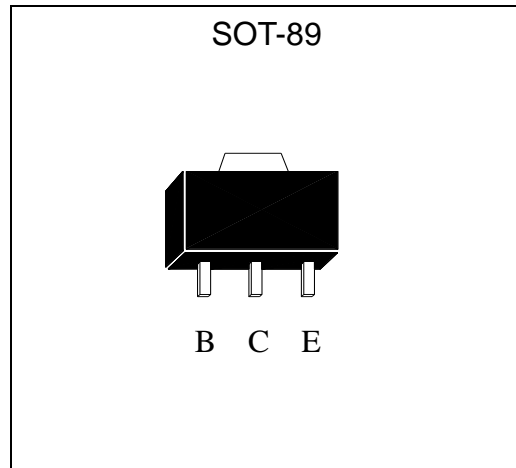
### Description

The BTD2195M3 is designed for use in general purpose amplifier and low speed switching application. Pb-free lead plating package process is adopted.

### Equivalent Circuit

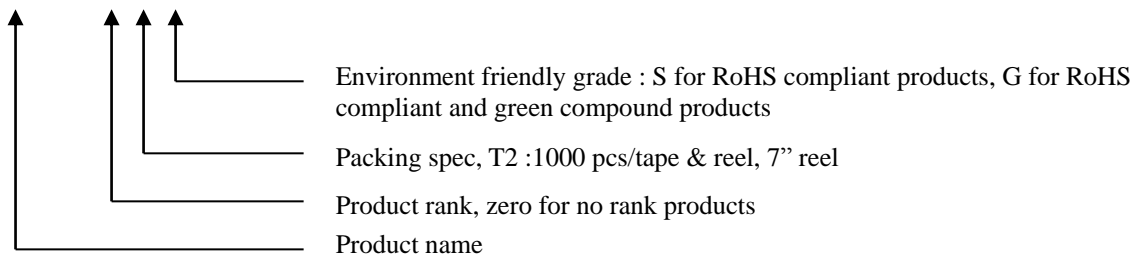


### Outline



### Ordering Information

Device	Package	Shipping
BTD2195M3-0-T2-G	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel





**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V <sub>CB0</sub>	150	V
Collector-Emitter Voltage	V <sub>CEO</sub>	150	
Emitter-Base Voltage	V <sub>EBO</sub>	5	
Collector Current (DC)	I <sub>C</sub>	4	A
Collector Current (Pulse)	I <sub>CP</sub>	6 (Note 1)	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	208	°C/W
		125 (Note 2)	
		62.5 (Note 3)	
		85 (Note 4)	
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	43	
Power Dissipation	P <sub>D</sub>	0.7	W
		1.2 (Note 2)	
		2.5 (Note 3)	
Power Dissipation @ T <sub>C</sub> =25°C		3.5	
Operating Junction Temperature Range	T <sub>j</sub>	-55~+175	°C
Storage Temperature Range	T <sub>stg</sub>	-55~+175	

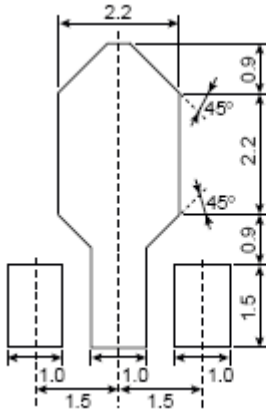
- Note : 1. Single Pulse Pw ≤ 350μs, Duty ≤ 2%.  
 2. When mounted on a FR-4 PCB with area measuring 10×10×1 mm.  
 3. When mounted on a ceramic board with area measuring 40×40×1mm.  
 4. When mounted on a FR-4 PCB with area measuring 30×30×1 mm.

**Characteristics** (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV <sub>CB0</sub>	150	-	-	V	I <sub>C</sub> =100μA, I <sub>E</sub> =0
I <sub>CB0</sub>	-	-	100	nA	V <sub>CB</sub> =150V, I <sub>E</sub> =0
I <sub>CEO</sub>	-	-	1	μA	V <sub>CE</sub> =150V, I <sub>B</sub> =0
I <sub>EBO</sub>	-	-	2	mA	V <sub>EB</sub> =5V, I <sub>C</sub> =0
*V <sub>CE(sat)</sub>	-	-	1.2	V	I <sub>C</sub> =2A, I <sub>B</sub> =2mA
*V <sub>BE(on)</sub>			2.2	V	V <sub>CE</sub> =4V, I <sub>C</sub> =2A
*h <sub>FE1</sub>	2000	-	-	-	V <sub>CE</sub> =4V, I <sub>C</sub> =1A
*h <sub>FE2</sub>	1000	-	-	-	V <sub>CE</sub> =4V, I <sub>C</sub> =2A
Cob	-		200	pF	V <sub>CB</sub> =10V, I <sub>E</sub> =0A, f=1MHz

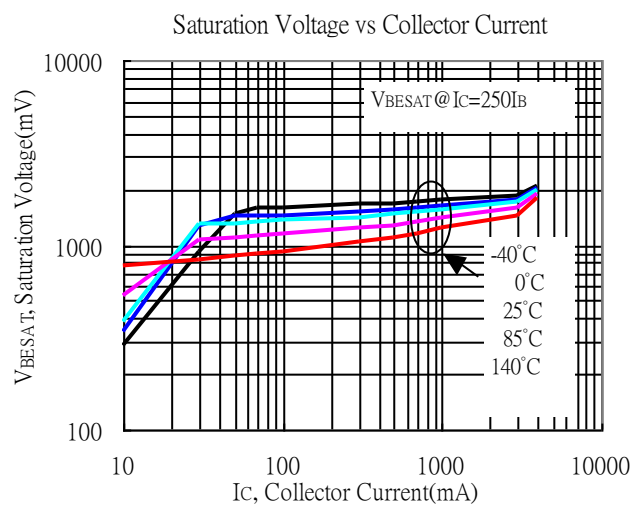
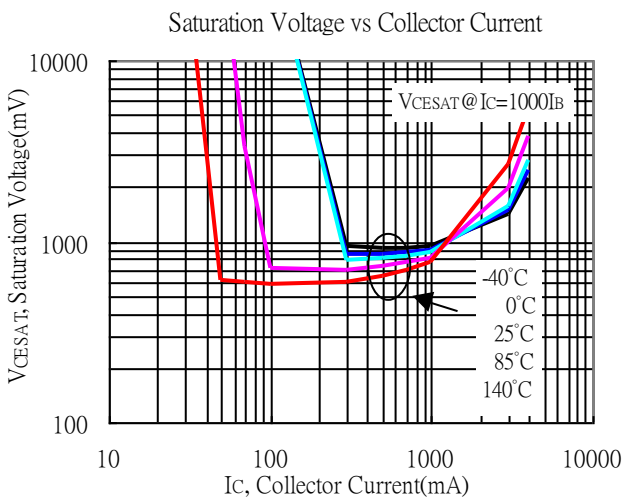
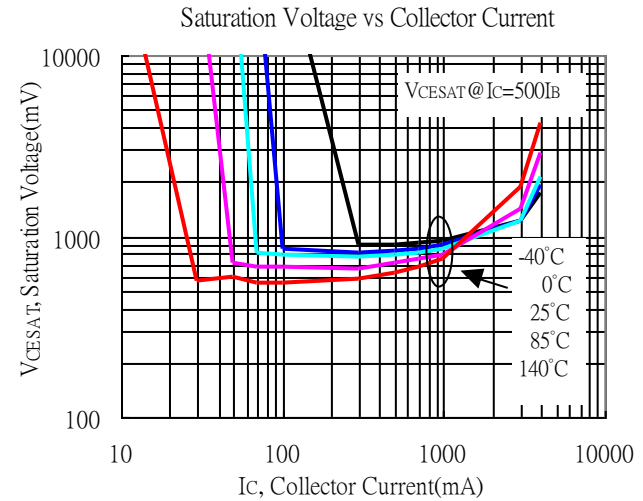
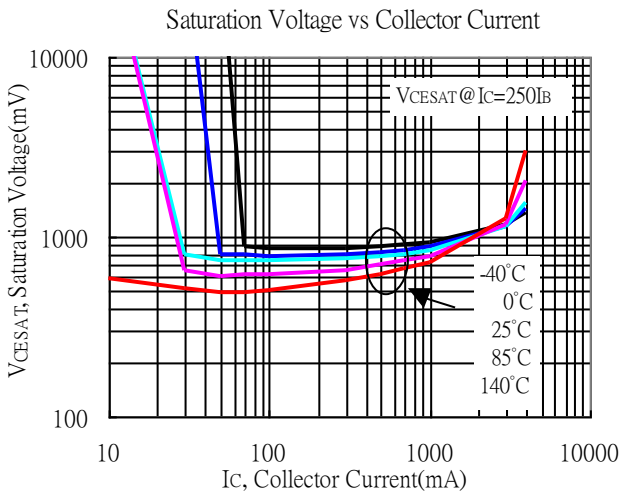
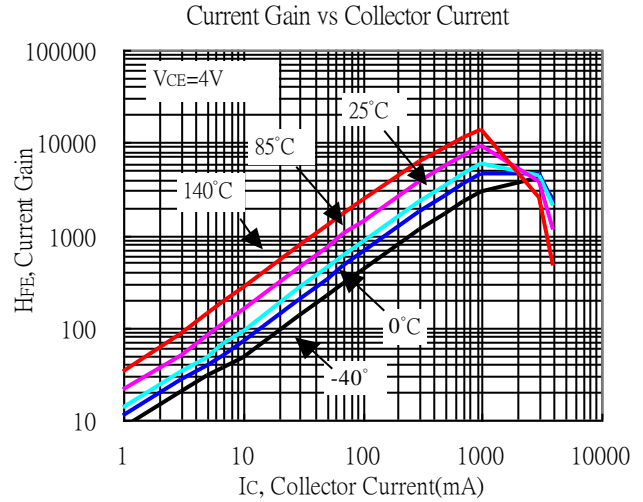
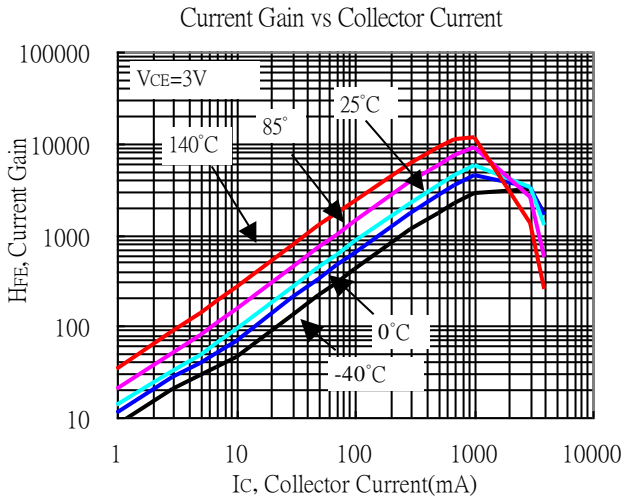
\*Pulse Test : Pulse Width ≤ 380μs, Duty Cycle ≤ 2%

### Recommended soldering footprint



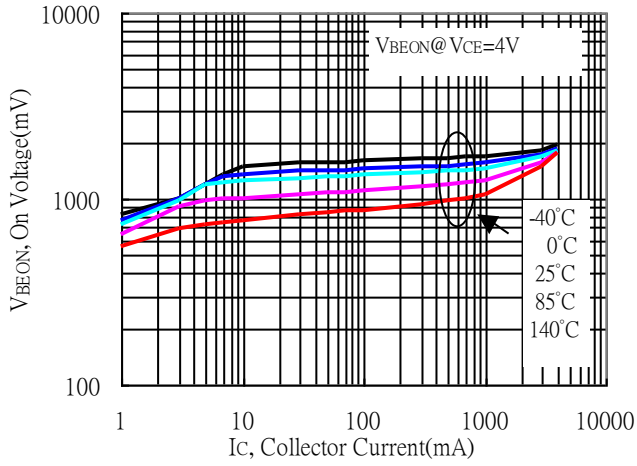
unit : mm

**Typical Characteristics**

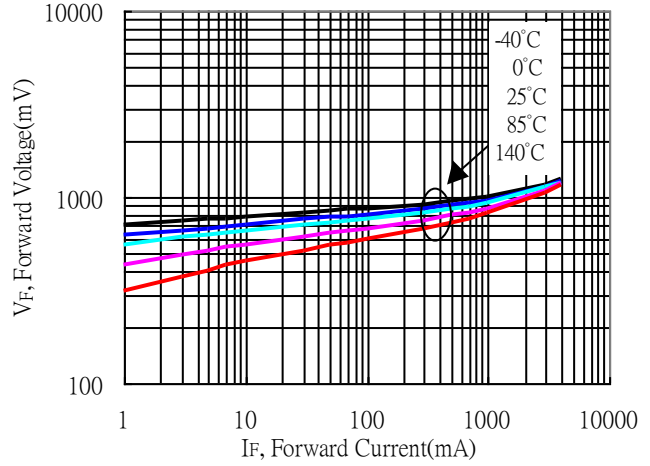


**Typical Characteristics(Cont.)**

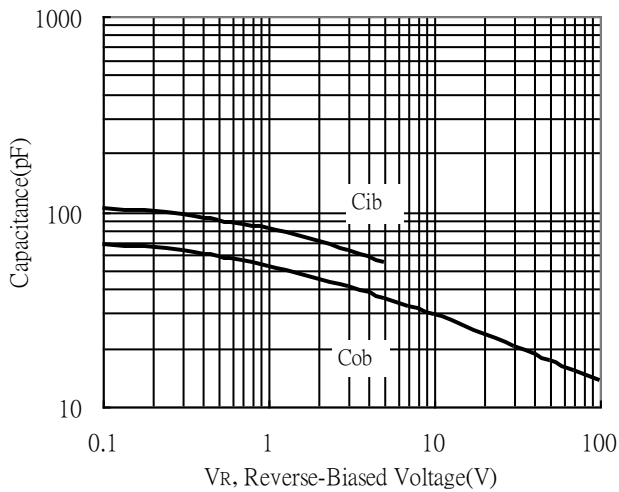
On Voltage vs Collector Current



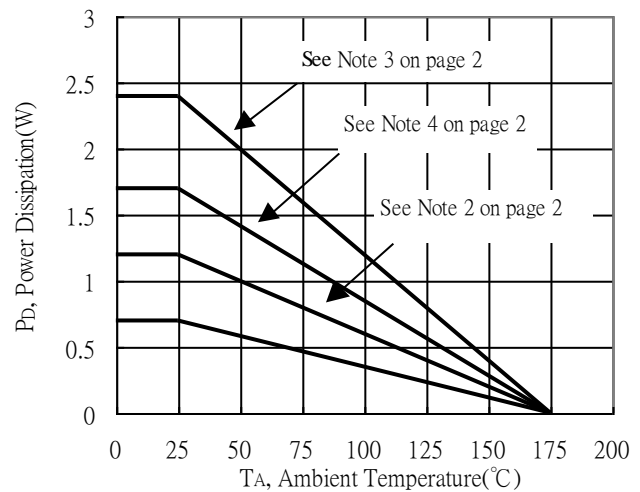
Built-in Diode Characteristics



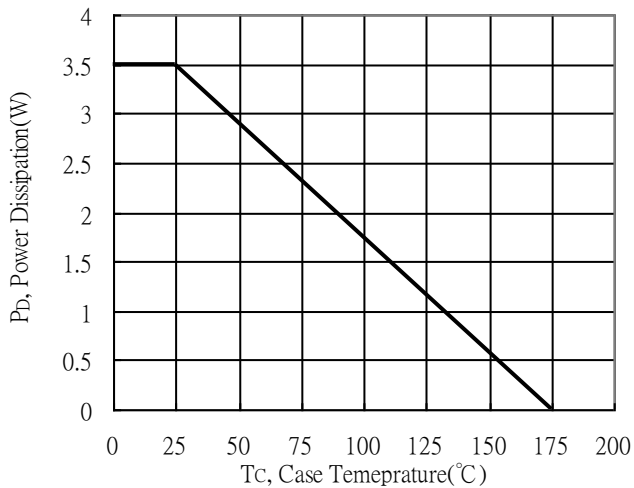
Capacitance vs Reverse-Biased Voltage



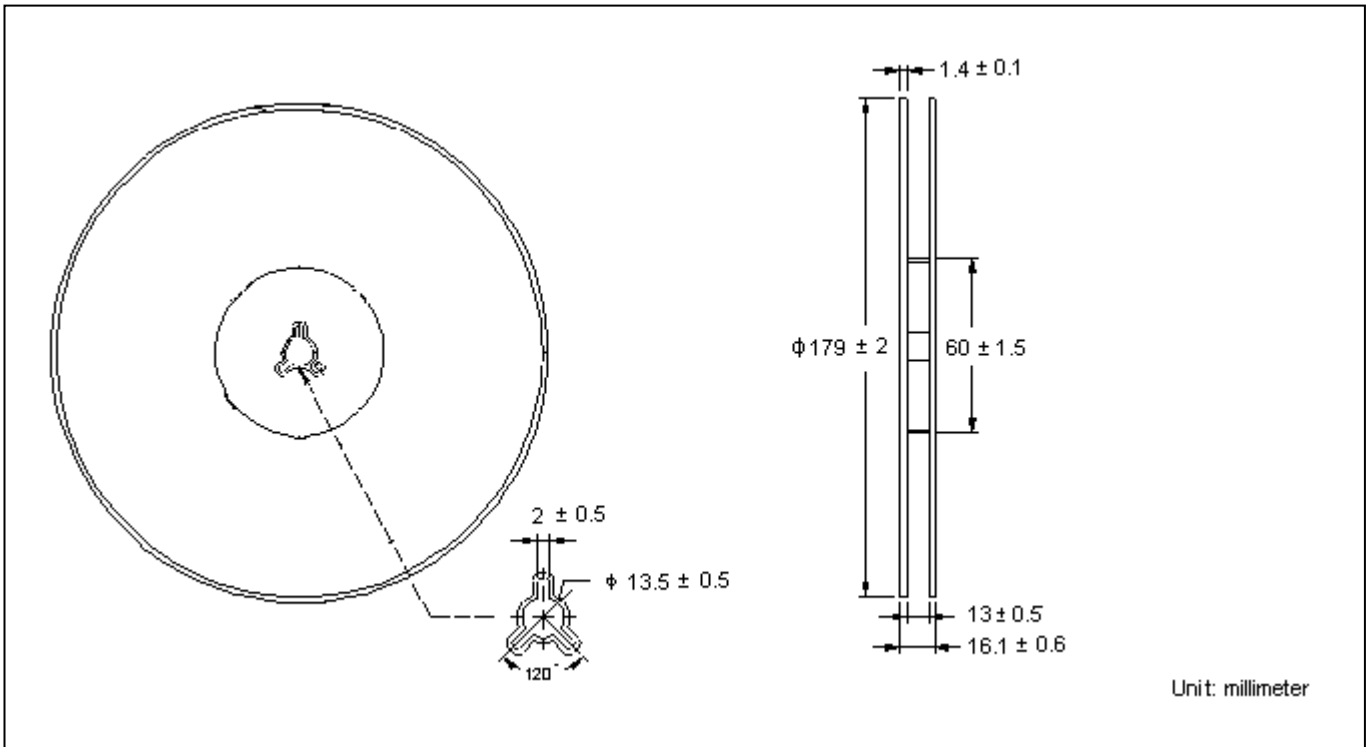
Power Derating Curves



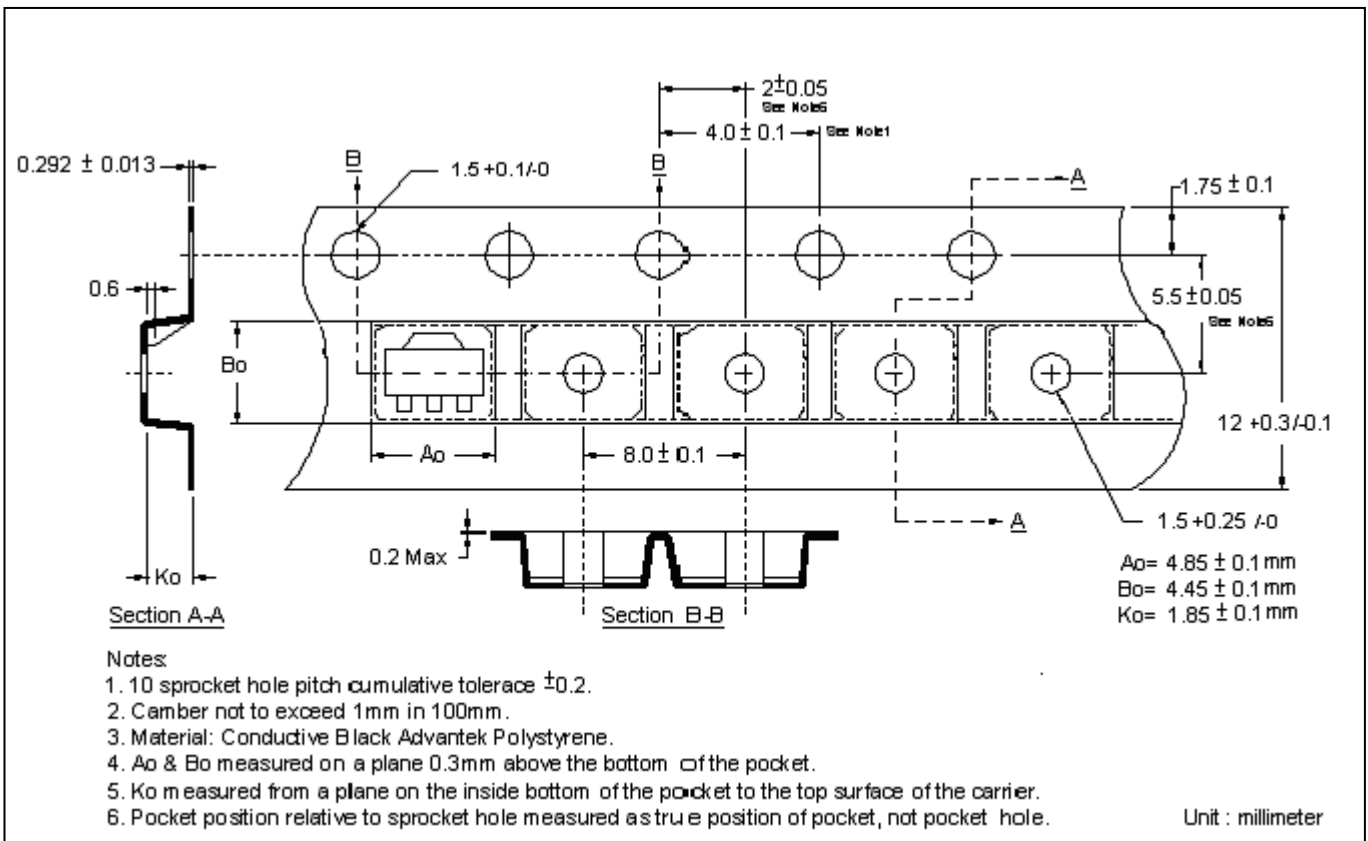
Power Derating Curve



**Reel Dimension**



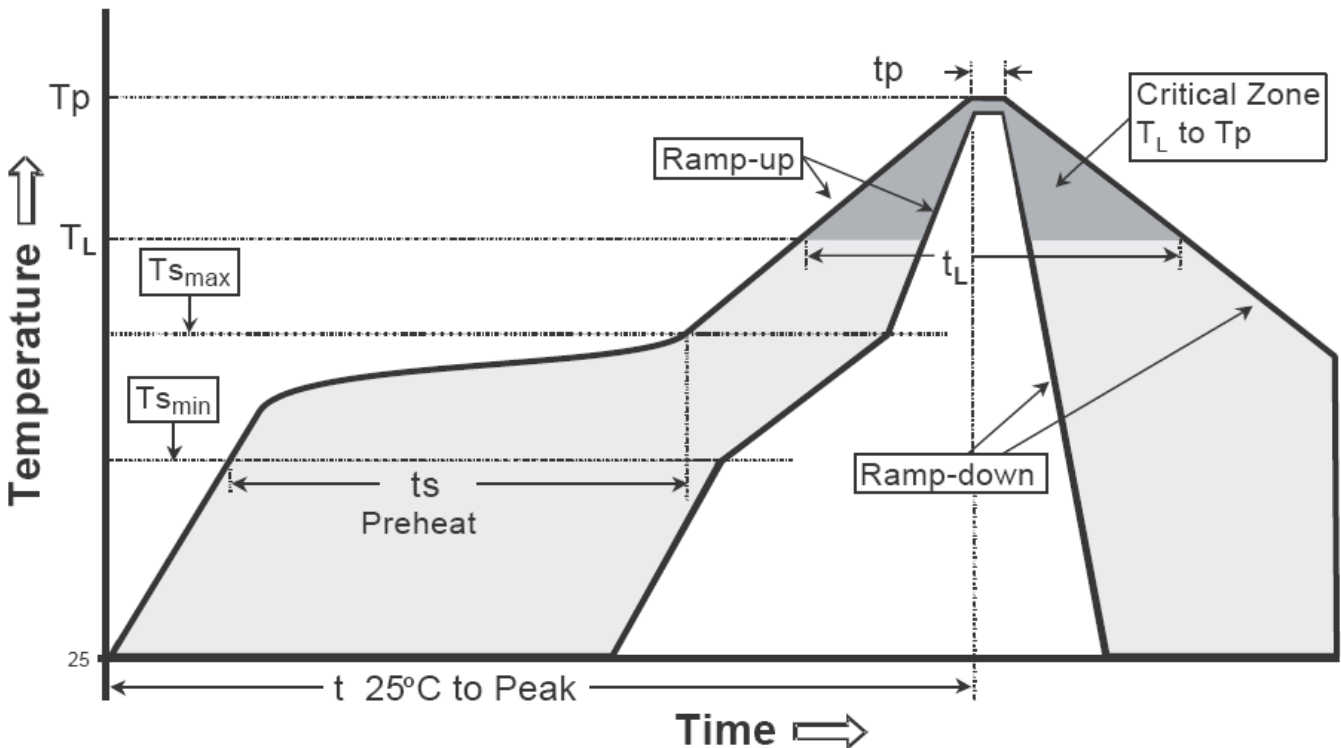
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

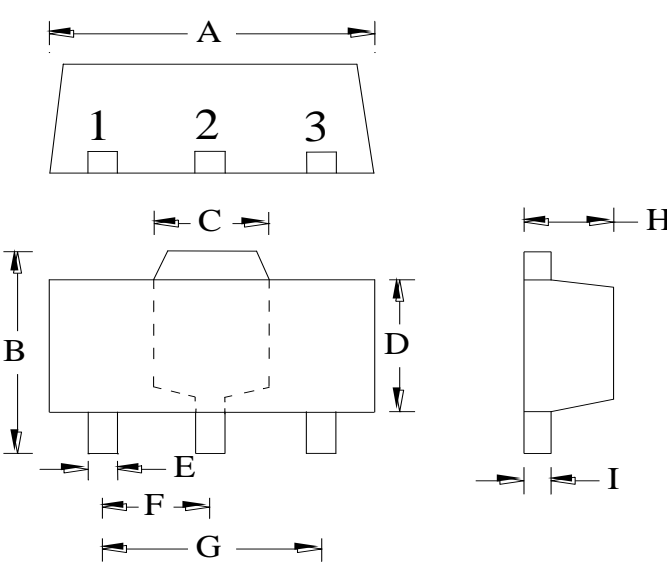
**Recommended temperature profile for IR reflow**



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.

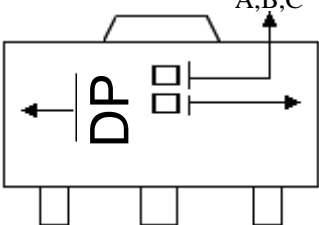
Note : All temperatures refer to topside of the package, measured on the package body surface.

**SOT-89 Dimension**



The diagram shows three views of the SOT-89 package: a top view with dimensions A, C, E, F, and G; a front view with dimensions B, D, and I; and a side view with dimension H. The top view also labels the three leads as 1, 2, and 3.

**Marking:**



month code: 1~9, A,B,C  
 Year code : 6→2006, 7→2007,...

Product Code ← DP →

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

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

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	1.40	1.60
D	0.0906	0.1024	2.30	2.60	I	0.0138	0.0173	0.35	0.44
E	0.0126	0.0205	0.32	0.52					

- Notes:**
- Controlling dimension: millimeters.
  - Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
  - 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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