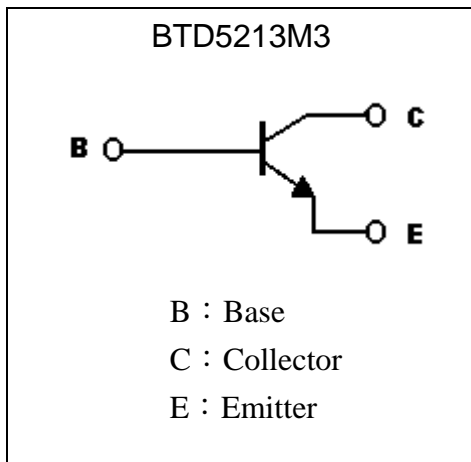
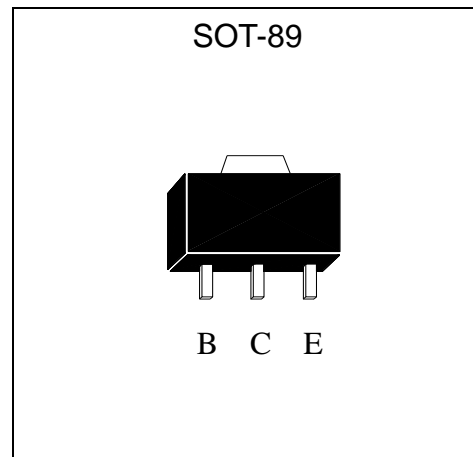


**NPN Epitaxial Planar Transistor**

# BTD5213M3

**Features**

- High  $V_{CEO}$ ,  $V_{CEO}=100V$
- High  $I_C$ ,  $I_{C(DC)}=1A$
- Low  $V_{CE(sat)}$
- Good current gain linearity
- Complementary to BTB1260M3
- Pb-free lead plating and halogen-free package

**Symbol**

**Outline**

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

Parameter	Symbol	Limit	Unit
Collector-Base Voltage	$V_{CBO}$	100	V
Collector-Emitter Voltage	$V_{CEO}$	100	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Collector Current (DC)	$I_C$	1	A
Collector Current (Pulse)	$I_{CP}$	2 (Note 1)	A
Power Dissipation	$P_d$	0.6	W
		1 (Note 2)	W
		2 (Note 3)	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	208	$^{\circ}C/W$
		125 (Note 2)	$^{\circ}C/W$
		62.5 (Note 3)	$^{\circ}C/W$
Junction Temperature	$T_j$	150	$^{\circ}C$
Storage Temperature	$T_{stg}$	-55~+150	$^{\circ}C$

Note : 1. Single Pulse  $P_w \leq 350\mu s$ , Duty  $\leq 2\%$ .

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>	100	-	-	V	I <sub>C</sub> =50μA, I <sub>E</sub> =0
BV <sub>CEO</sub>	100	-	-	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>	-	-	1	μA	V <sub>CB</sub> =80V, I <sub>E</sub> =0
I <sub>EBO</sub>	-	-	1	μA	V <sub>EB</sub> =4V, I <sub>C</sub> =0
*V <sub>CE(sat)</sub>	-	-	0.3	V	I <sub>C</sub> =500mA, I <sub>B</sub> =20mA
*h <sub>FE</sub>	160	-	400	-	V <sub>CE</sub> =3V, I <sub>C</sub> =100mA
f <sub>T</sub>	-	230	-	MHZ	V <sub>CE</sub> =10V, I <sub>C</sub> =50mA, f=100MHZ
Cob	-	6	-	pF	V <sub>CB</sub> =10V, f=1MHZ

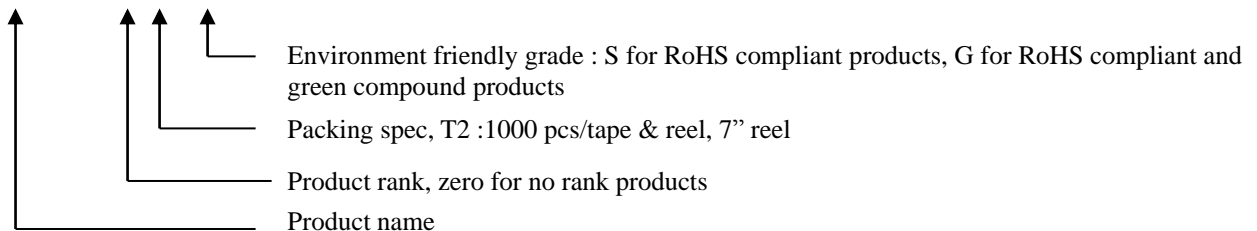
\*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

**Classification Of hFE**

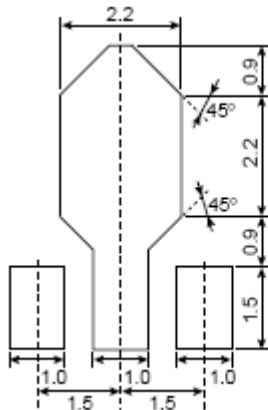
Rank	Q	R
Range	160~320	200~400

**Ordering Information**

Device	Package	Shipping
BTD5213M3-X-T2-G	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel

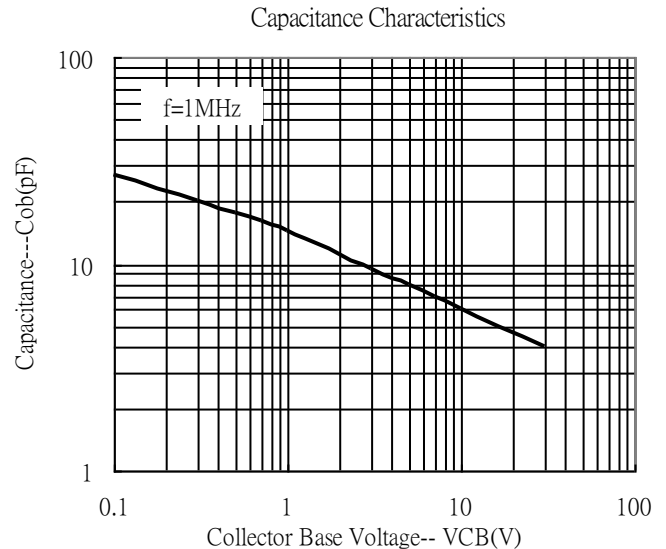
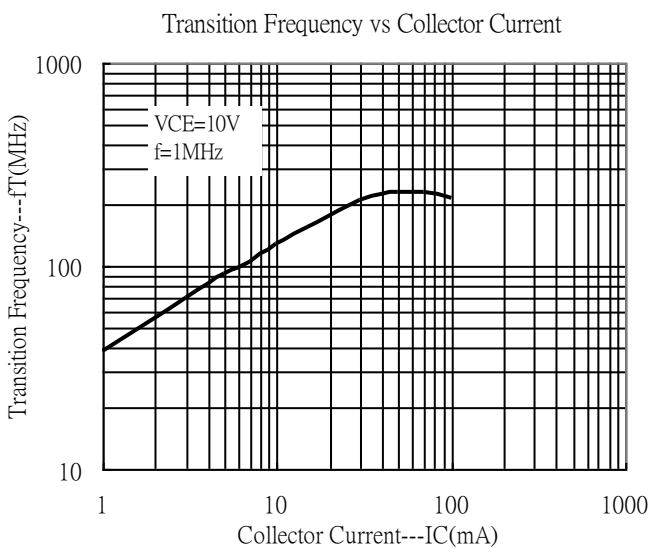
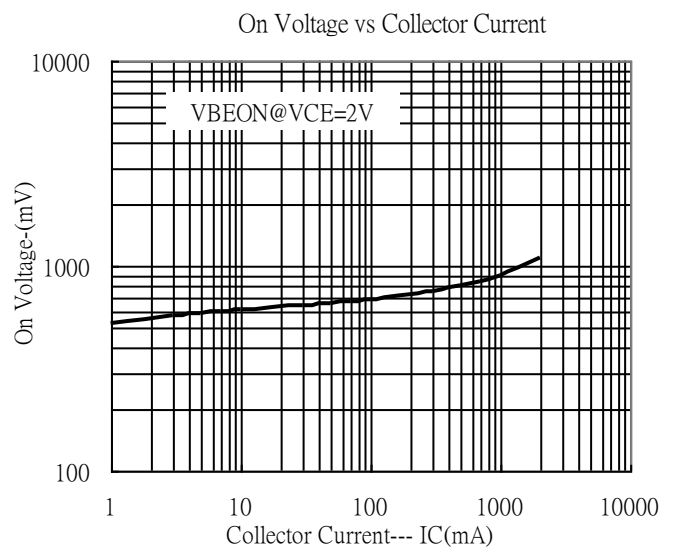
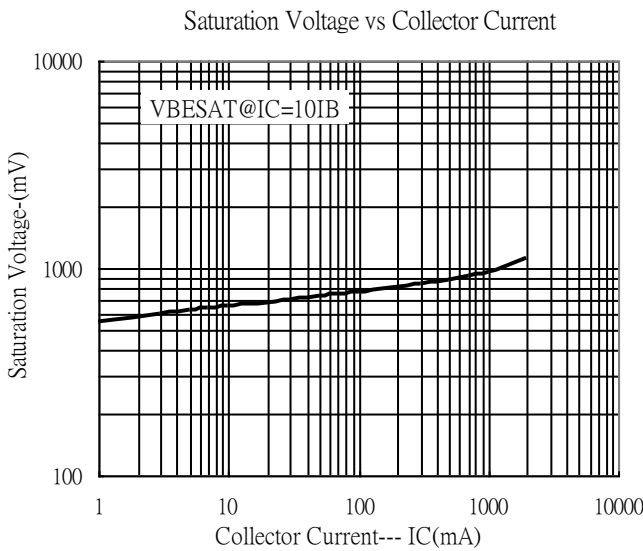
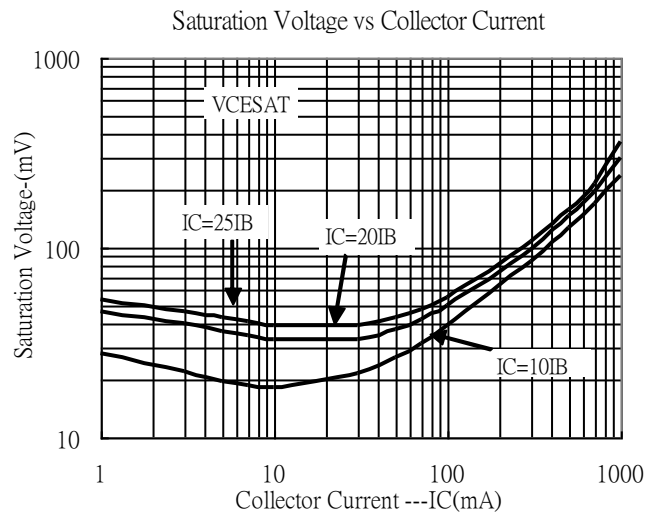
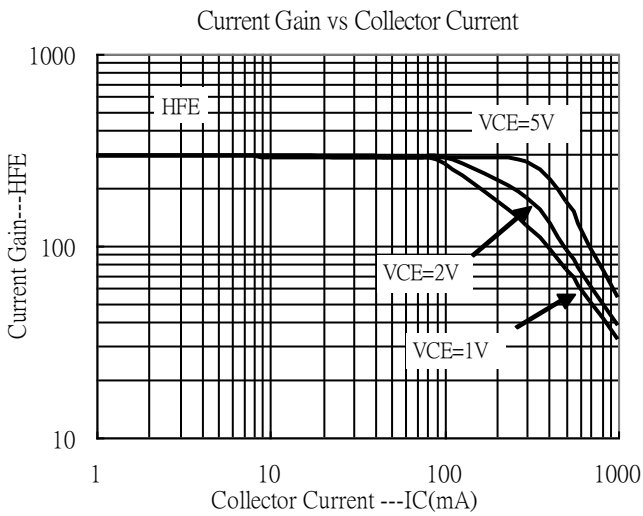


**Recommended soldering footprint**



unit : mm

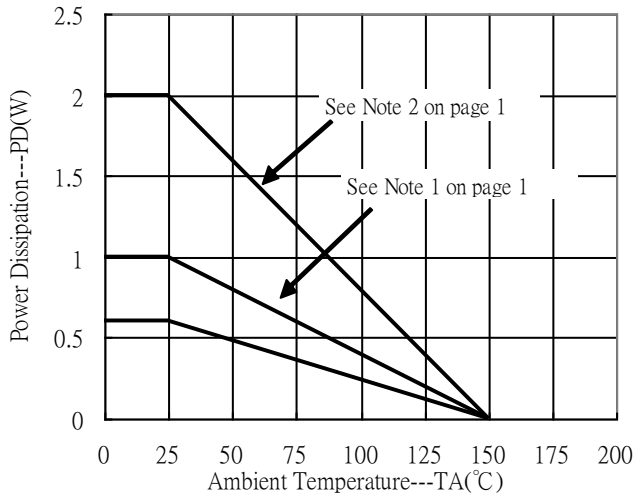
**Typical Characteristics**



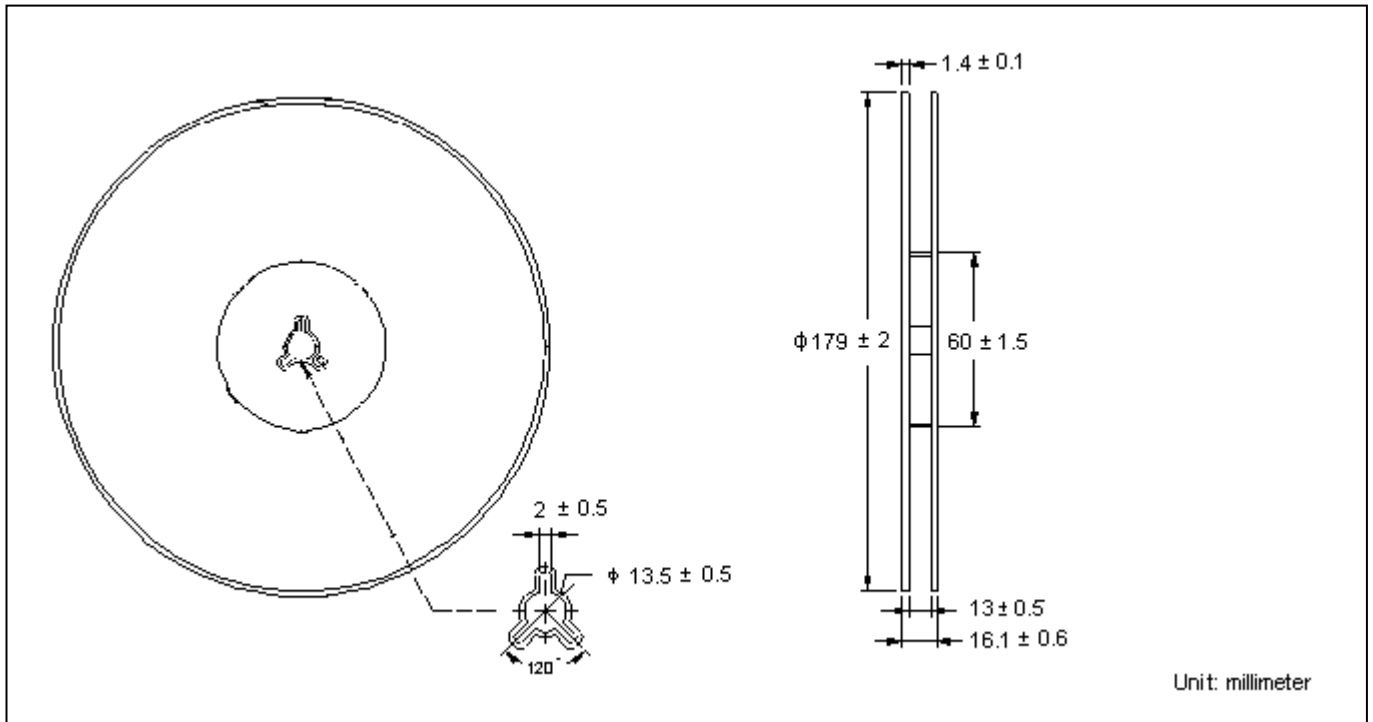


### Typical Characteristics(Cont.)

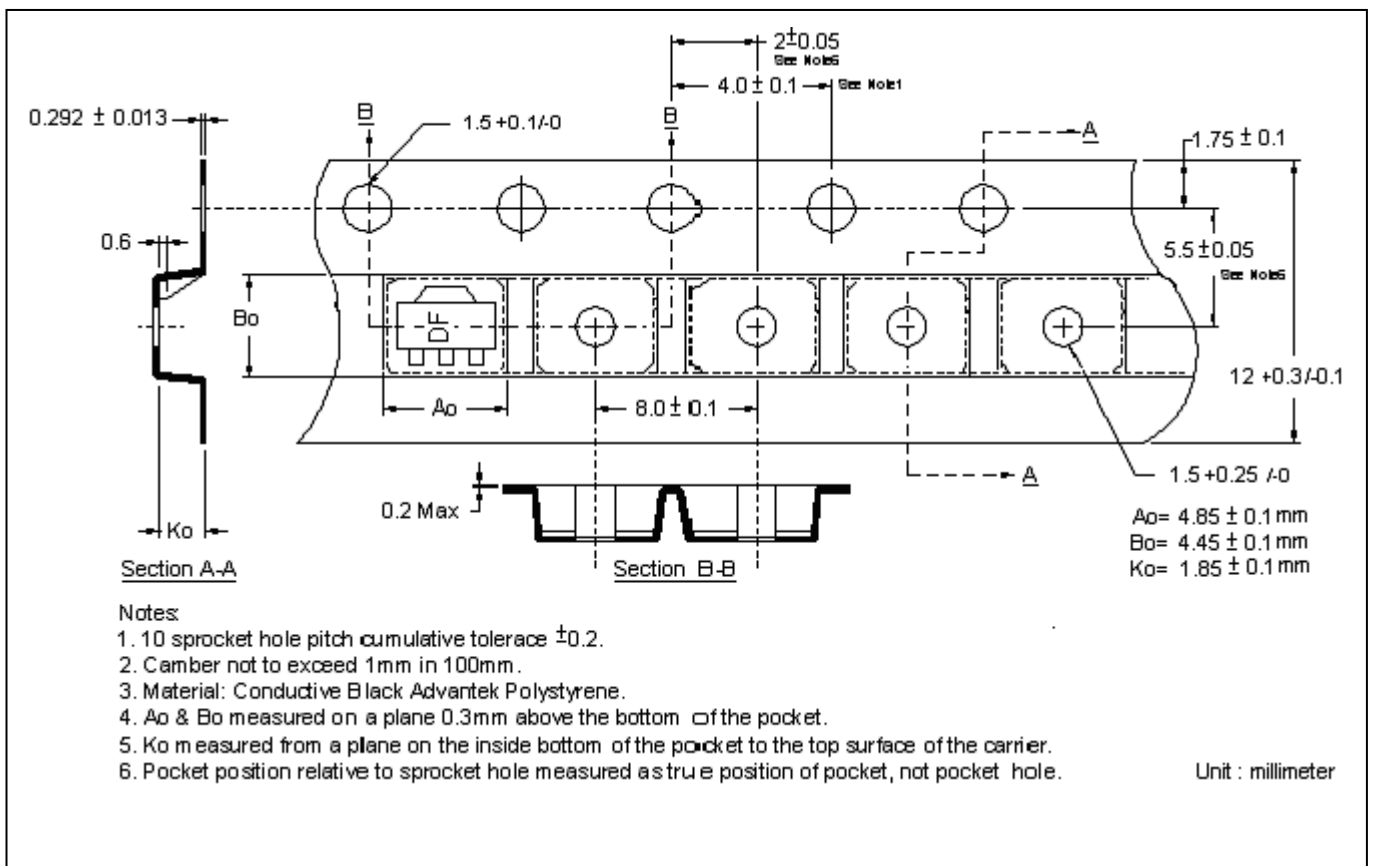
Power Derating Curves



**Reel Dimension**



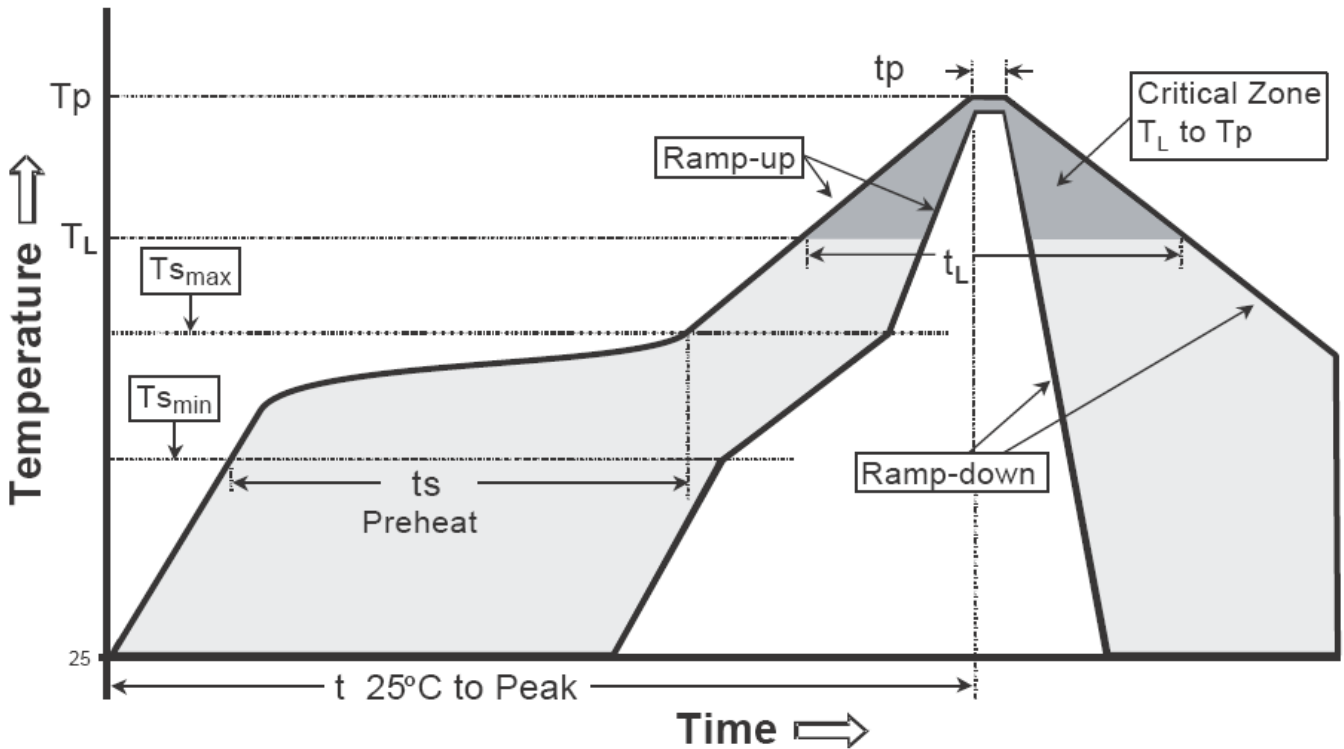
**Carrier Tape Dimension**



**Recommended wave soldering condition**

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

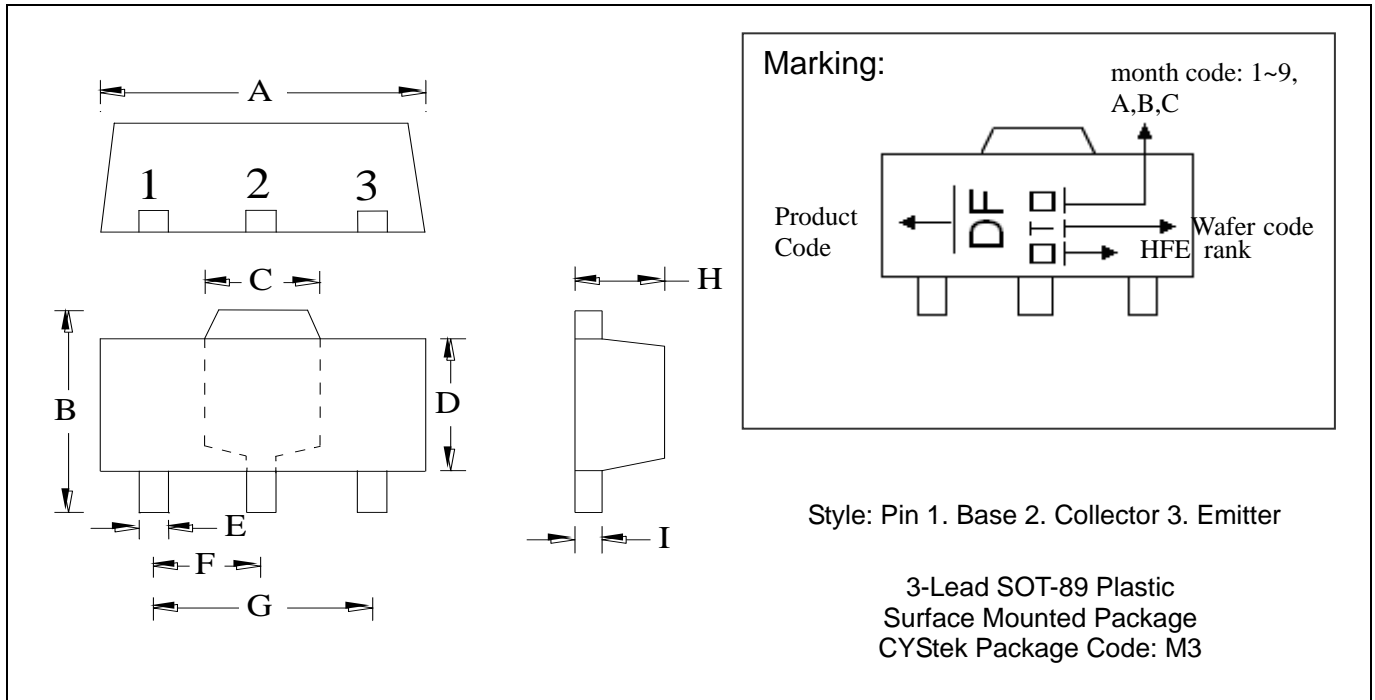
**Recommended temperature profile for IR reflow**



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**



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:** 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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