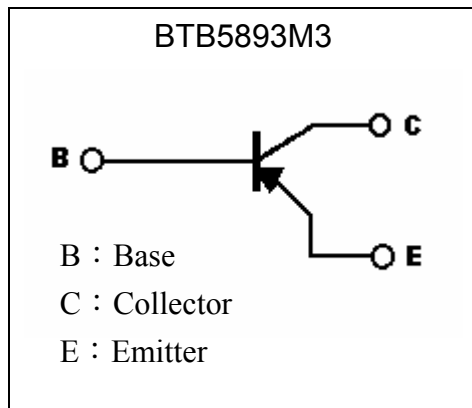
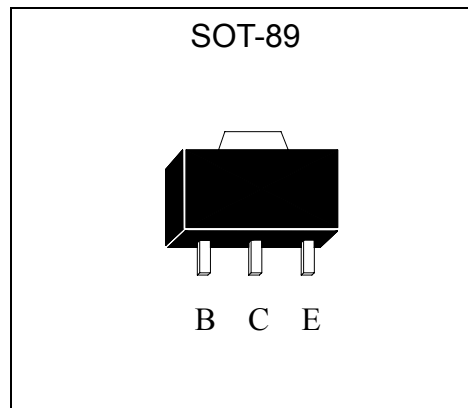


Low Vcesat PNP Epitaxial Planar Transistor

BTB5839M3

Features

- Low $V_{CE(sat)}$, $V_{CE(sat)} = -0.3 \text{ V (max)}$, at $I_C / I_B = -2\text{A} / -0.1\text{A}$
- Excellent current gain characteristics
- Pb-free lead plating and halogen-free package

Symbol

Outline

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

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	-50	V
Collector-Emitter Voltage	V_{CEO}	-30	V
Emitter-Base Voltage	V_{EBO}	-7	V
Collector Current (DC)	I_C	-3	A
Collector Current (Pulse)	I_{CP}	-5 (Note 1)	A
Power Dissipation	P_d	0.6	W
Power Dissipation	P_d	2 (Note 2)	W
Operating Junction and Storage Temperature Range	$T_j ; T_{stg}$	-55~+150	$^\circ\text{C}$

**Thermal Data**

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	30.4	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	208	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{th,j-a}$	62.5	°C/W

- Note : 1. Single Pulse , $P_w=10ms$
 2. When mounting on a 40 x40 x0.7 mm ceramic board.
 3. Human body model, 1.5k Ω in series with 100pF

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-50	-	-	V	$I_C=-50\mu A, I_E=0$
BV_{CEO}	-30	-	-	V	$I_C=-1mA, I_B=0$
BV_{EBO}	-7	-	-	V	$I_E=-50\mu A, I_C=0$
I_{CBO}	-	-	-100	nA	$V_{CB}=-50V, I_E=0$
I_{EBO}	-	-	-100	nA	$V_{EB}=-7V, I_C=0$
* $V_{CE(sat)}$	-	-0.05	-0.2	V	$I_C=-400mA, I_B=-20mA$
* $V_{CE(sat)}$	-	-0.2	-0.3	V	$I_C=-2A, I_B=-100mA$
* $R_{CE(sat)}$	-	0.1	0.15	Ω	$I_C=-2A, I_B=-100mA$
* $V_{BE(sat)}$	-	-1	-1.2	V	$I_C=-2A, I_B=-200mA$
* h_{FE1}	160	-	-	-	$V_{CE}=-2V, I_C=-100mA$
* h_{FE2}	180	-	390	-	$V_{CE}=-2V, I_C=-500mA$
* h_{FE3}	150	-	-	-	$V_{CE}=-2V, I_C=-1A$
f_T	-	190	-	MHz	$V_{CE}=-10V, I_C=-0.5A, f=100MHz$
Cob	-	33	-	pF	$V_{CB}=-10V, f=1MHz$

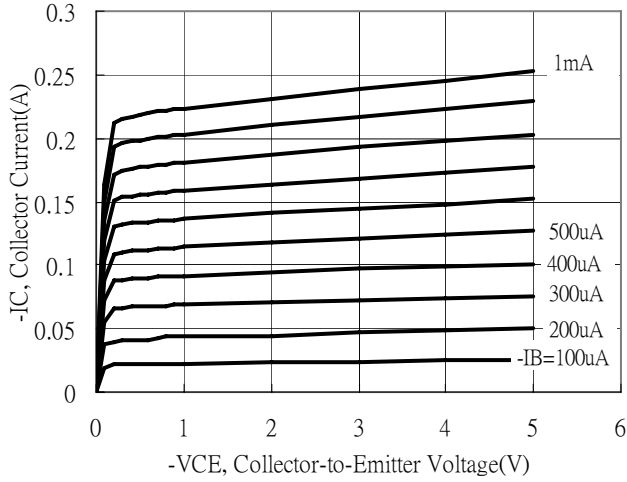
*Pulse Test : Pulse Width $\leq 380\mu s$, Duty Cycle $\leq 2\%$ **Ordering Information**

Device	Package	Shipping
BTB5839M3-T2-G	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel

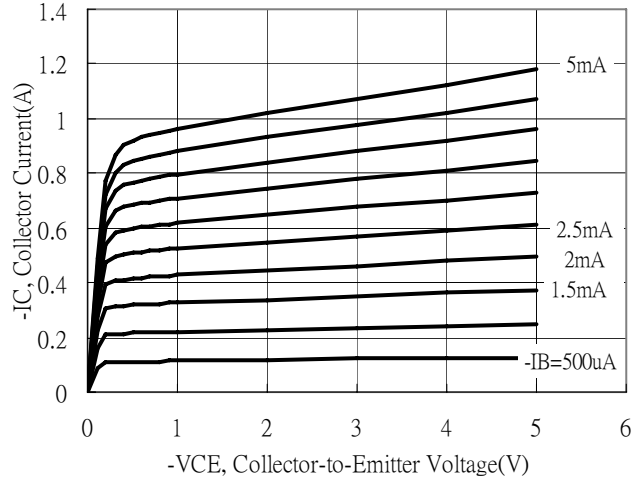


Typical Characteristics

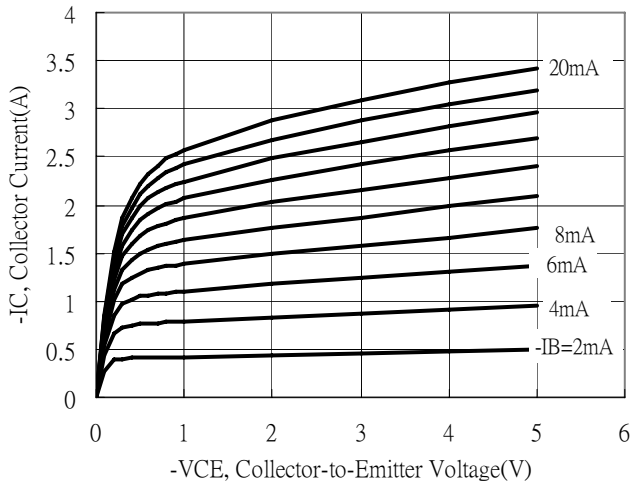
Emitter Grounded Output Characteristics



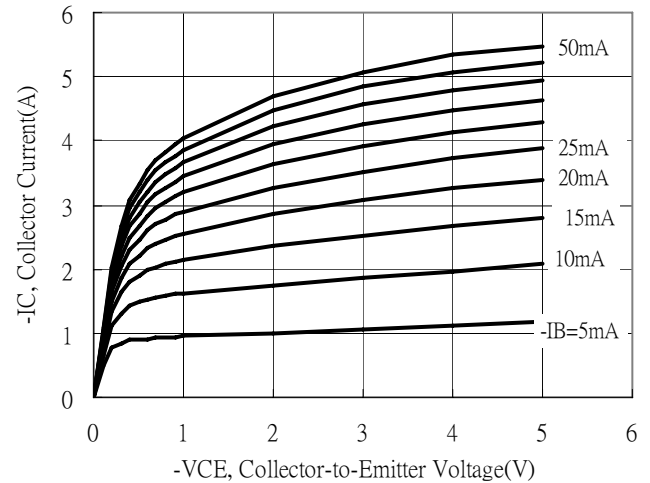
Emitter Grounded Output Characteristics



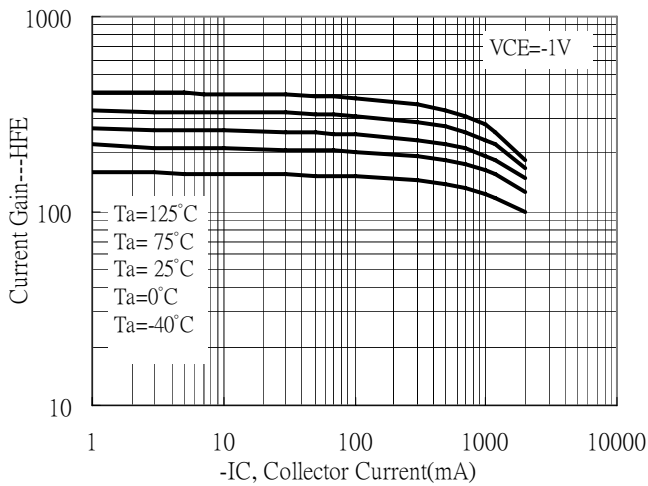
Emitter Grounded Output Characteristics



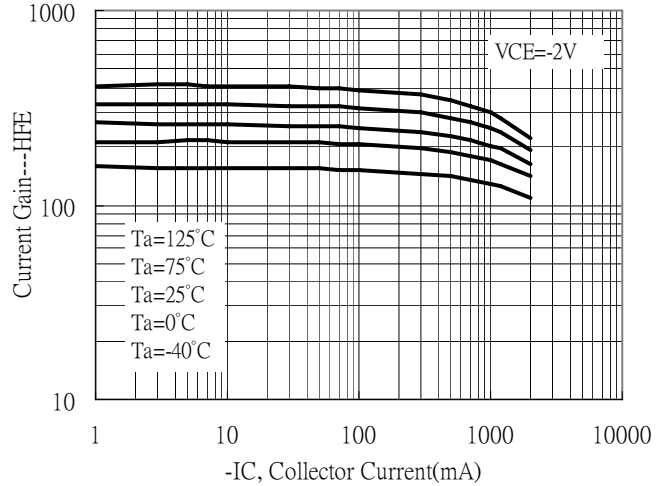
Emitter Grounded Output Characteristics



Current Gain vs Collector Current



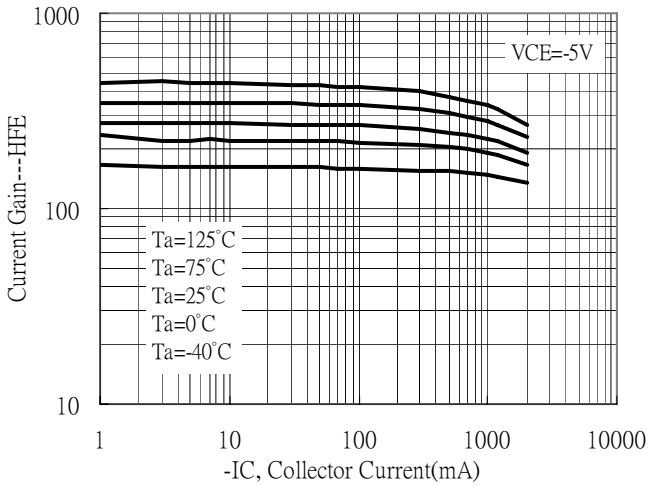
Current Gain vs Collector Current



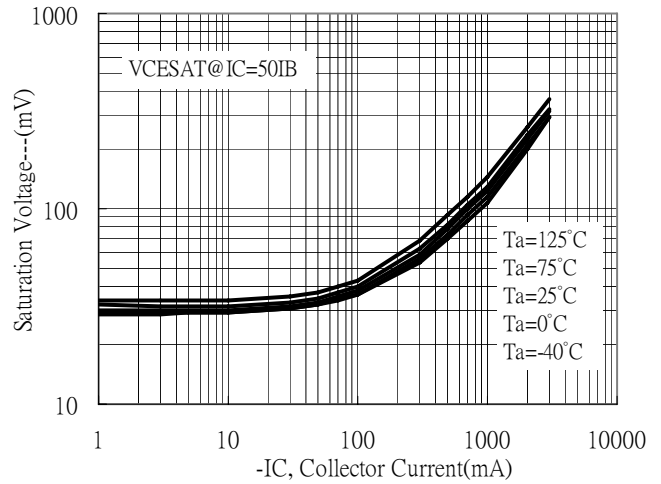


Typical Characteristics(Cont.)

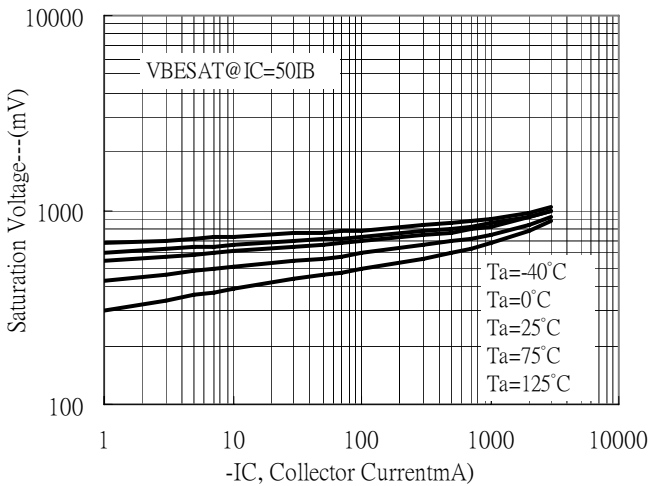
Current Gain vs Collector Current



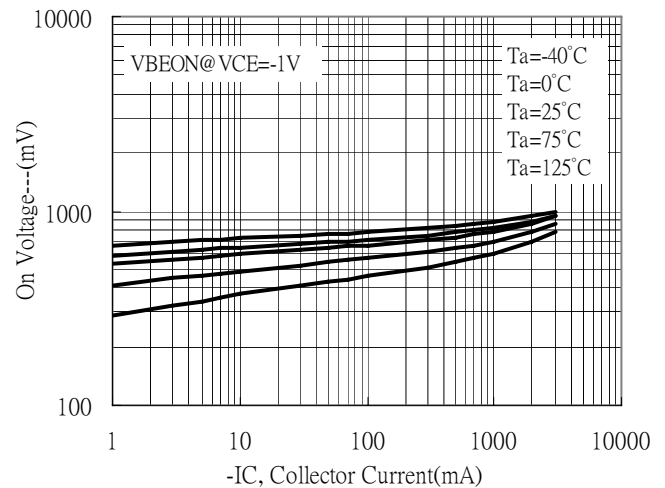
Saturation Voltage vs Collector Current



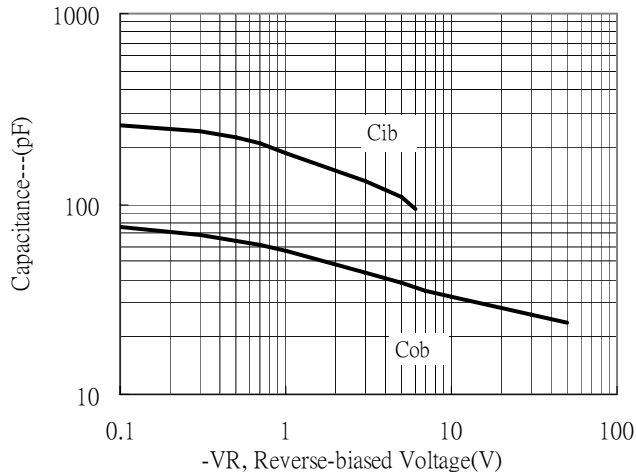
Saturation Voltage vs Collector Current



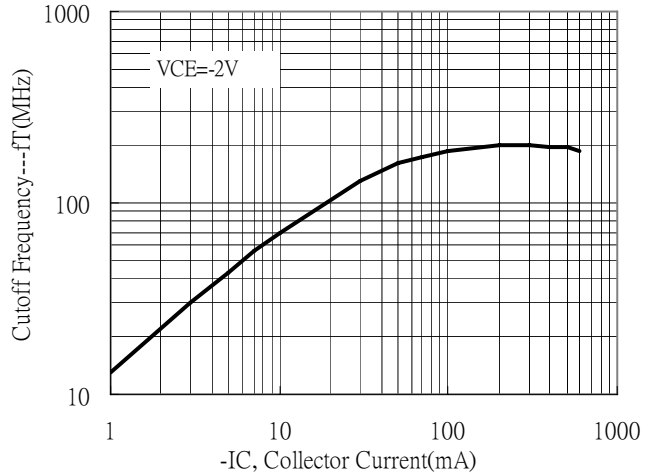
On Voltage vs Collector Current



Capacitance vs Reverse-biased Voltage

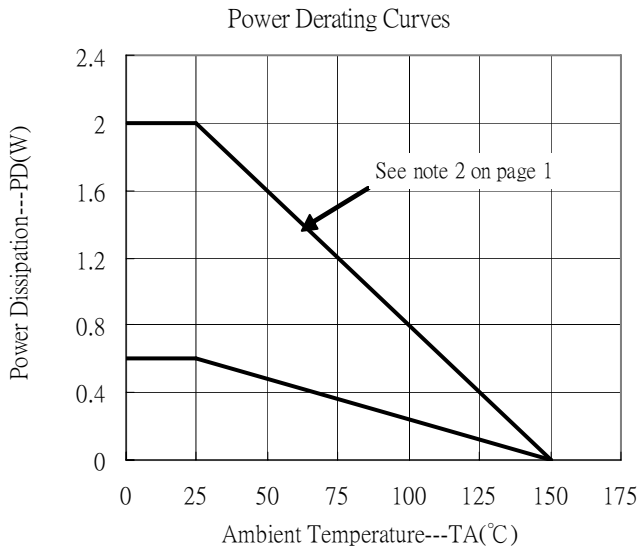


Cutoff Frequency vs Collector Current

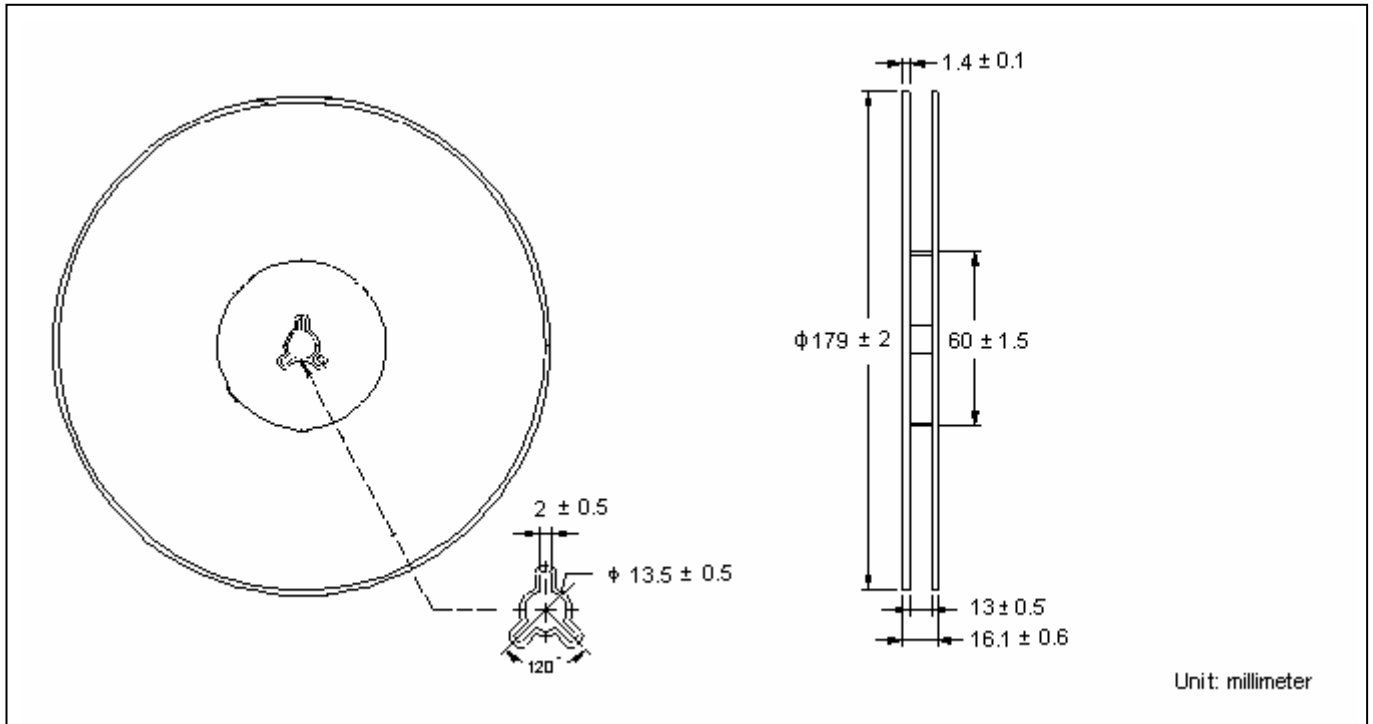




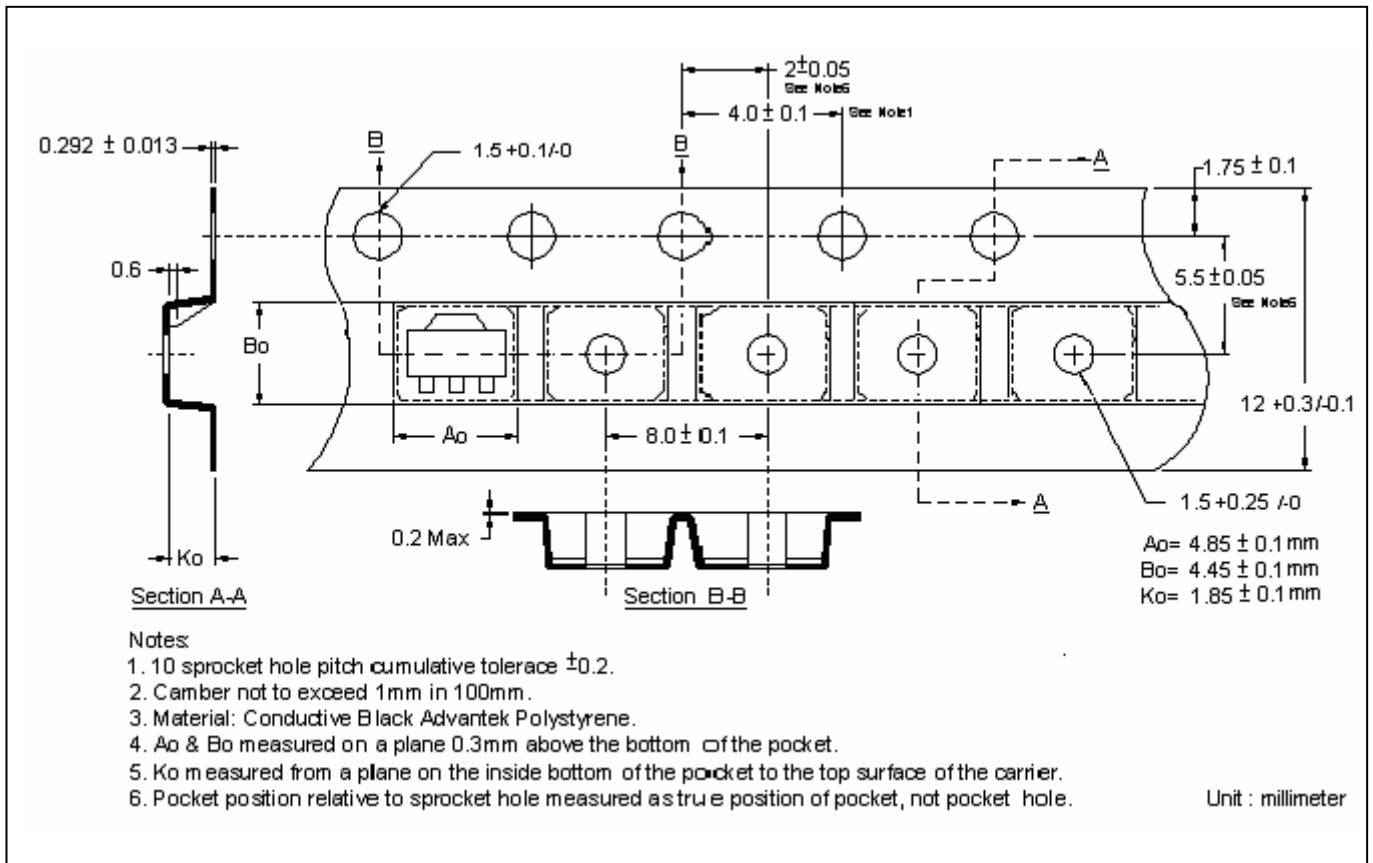
Typical Characteristics(Cont.)



Reel Dimension



Carrier Tape Dimension

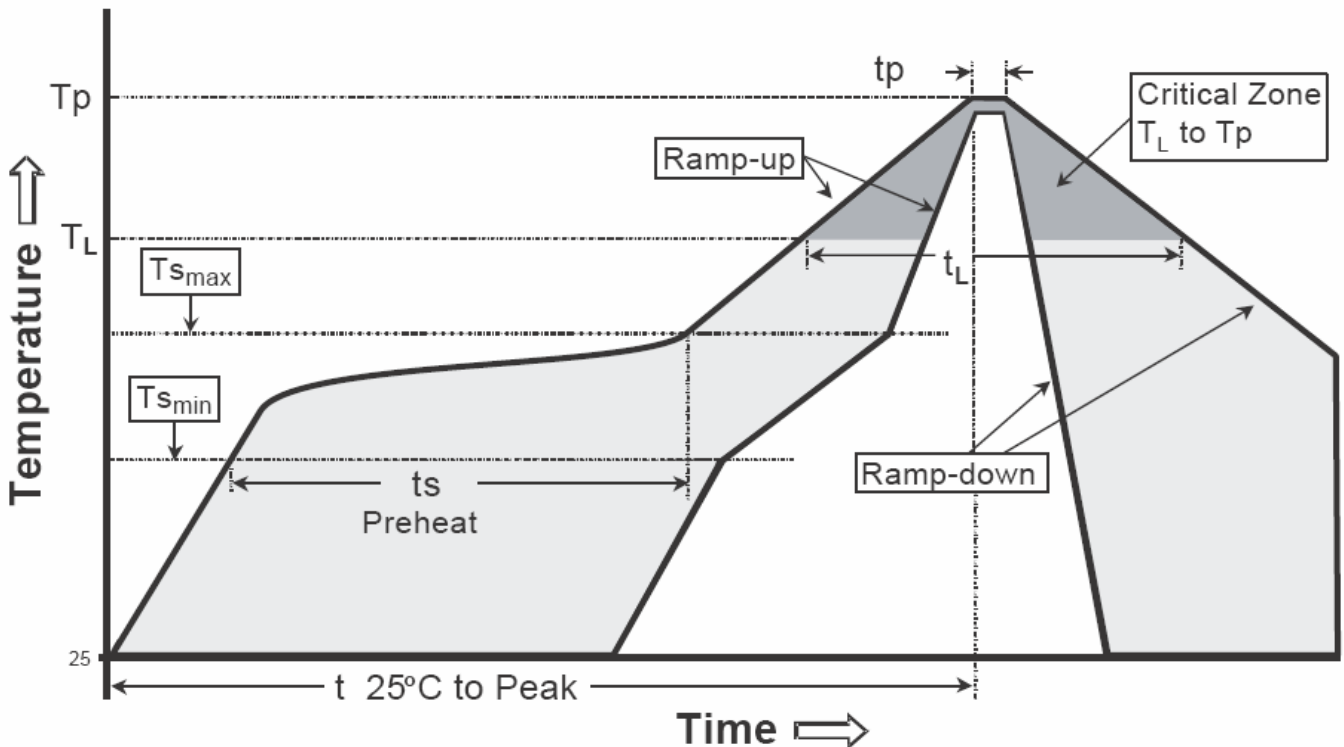




Recommended wave soldering condition

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

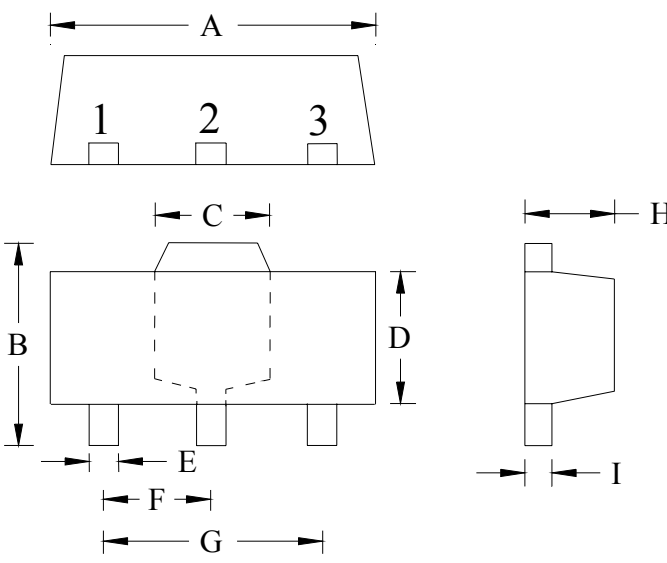
Recommended temperature profile for IR reflow



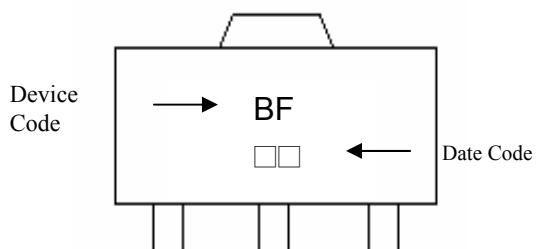
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T _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-89 Dimension



Marking:



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: 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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