General Purpose NPN Epitaxial Planar Transistor

BTC3906M3

Description

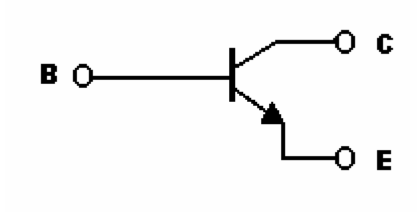
The BTC3906M3 is designed for general purpose applications requiring high breakdown voltage.

Features

- High collector-emitter breakdown voltage. (BV_{CEO}=160V @ I_C=1mA)
- Complement to BTA1514M3
- Pb-free package

Symbol

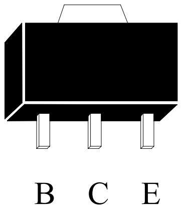
BTC3906M3



B：Base
C：Collector
E：Emitter

Outline

SOT-89



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	180	V
Collector-Emitter Voltage	V_{CEO}	160	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Power Dissipation	Pd	0.6	W
		1 (Note 1)	W
		2 (Note 2)	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Note : 1. When mounted on FR-4 PCB with area measuring 10×10×1 mm
2 . When mounted on ceramic with area measuring 40×40×1 mm

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	180	-	-	V	I_C=100μA
BV_{CEO}	160	-	-	V	I_C=1mA
BV_{EBO}	6	-	-	V	I_E=10μA
I_{CBO}	-	-	50	nA	V_{CB}=120V
I_{EBO}	-	-	50	nA	V_{EB}=4V
*$V_{CE(sat)}$1	-	0.1	0.15	V	I_C=10mA, I_B=1mA
*$V_{CE(sat)}$2	-	-	0.2.	V	I_C=50mA, I_B=5mA
*$V_{BE(sat)}$1	-	-	1	V	I_C=10mA, I_B=1mA
*$V_{BE(sat)}$2	-	-	1	V	I_C=50mA, I_B=5mA
*h_{FE}1	50	-	-	-	V_{CE}=5V, I_C=1mA
*h_{FE}2	60	-	-	-	V_{CE}=5V, I_C=10mA
*h_{FE}3	50	-	-	-	V_{CE}=5V, I_C=50mA
*h_{FE}4	120	-	390	-	V_{CE}=6V, I_C=2mA
f_T	100	-	-	MHz	V_{CE}=20V, I_C=10mA, f=100MHz
Cob	-	-	6	pF	V_{CB}=20V, I_E=0A,f=1MHz

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

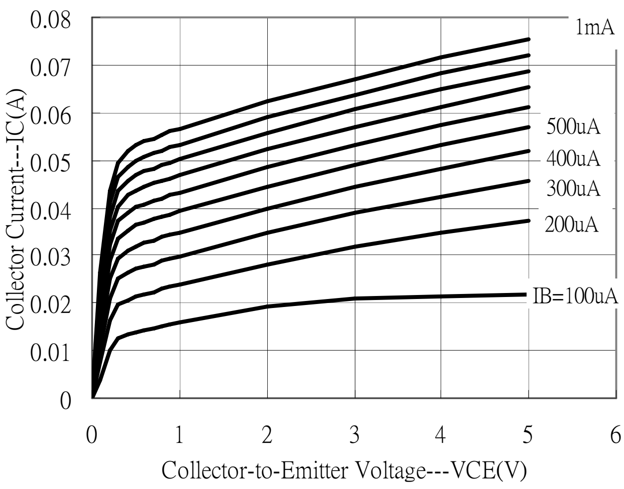
Classification Of h_{FE} 4

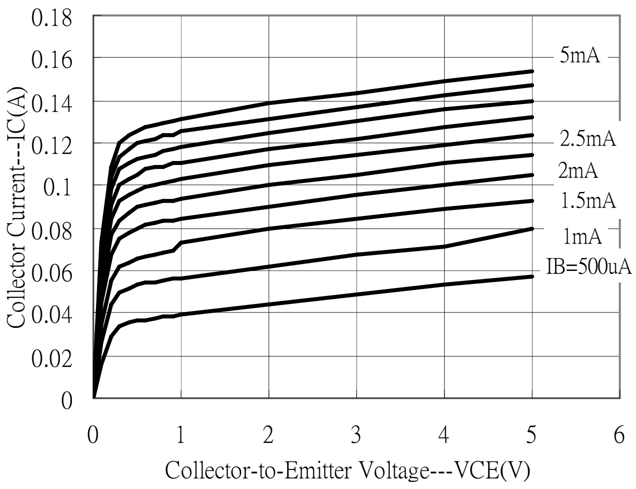
Rank	Q	R
Range	120~270	180~390

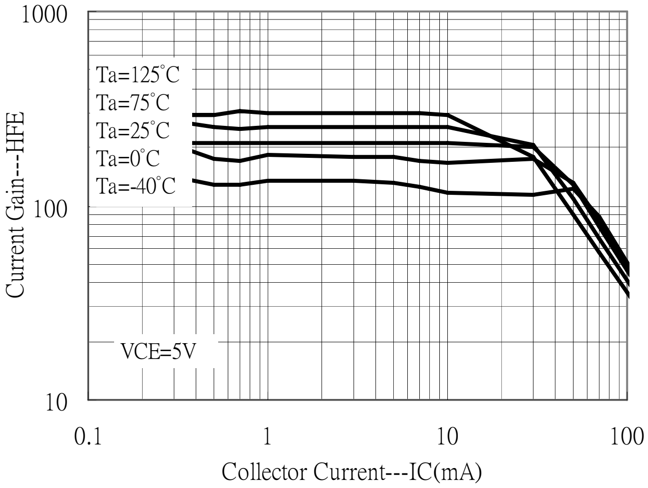
Ordering Information

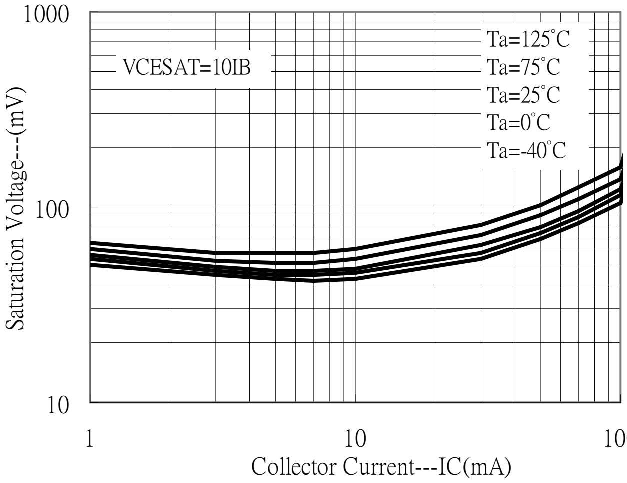
Device	HFE rank	Package	Shipping
BTC3906M3-T2-G	Q / R	SOT-89 (Pb-free lead plating and halogen-free)	1000 pcs / Tape & Reel

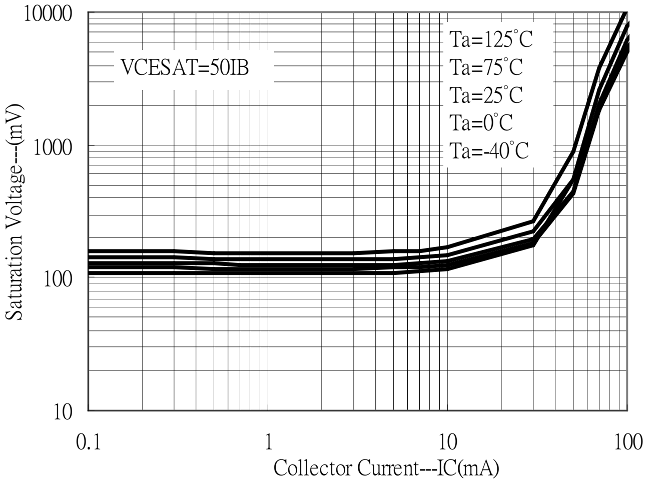
Typical Characteristics

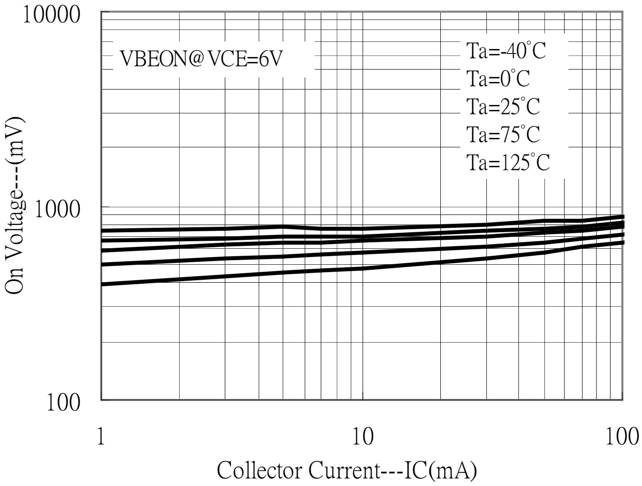

Emitter Grounded Output Characteristics


Emitter Grounded Output Characteristics

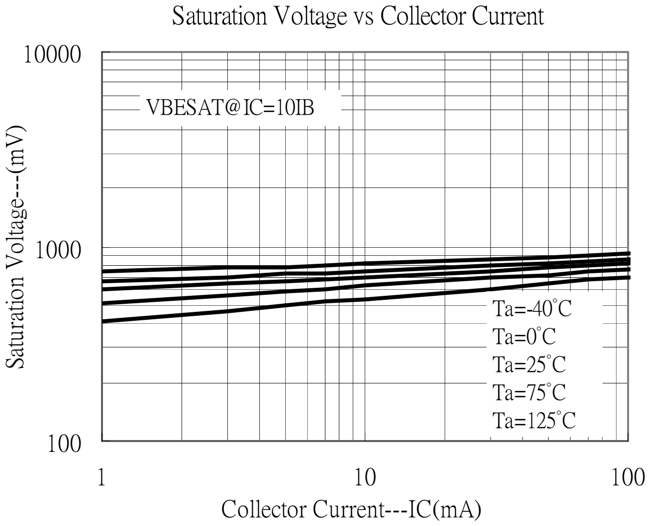

Current Gain vs Collector Current

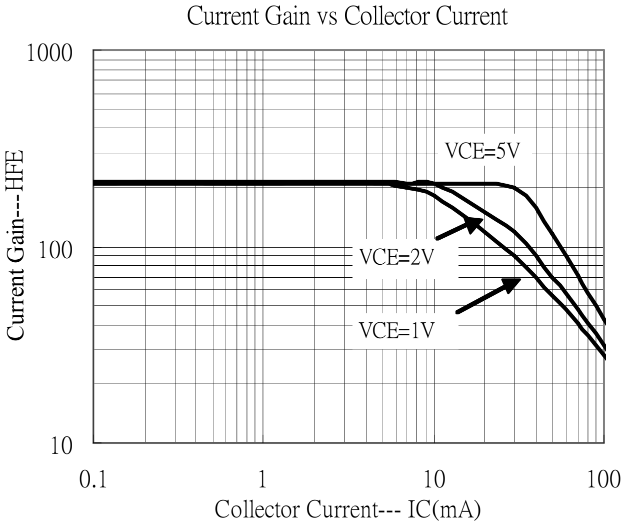

Saturation Voltage vs Collector Current

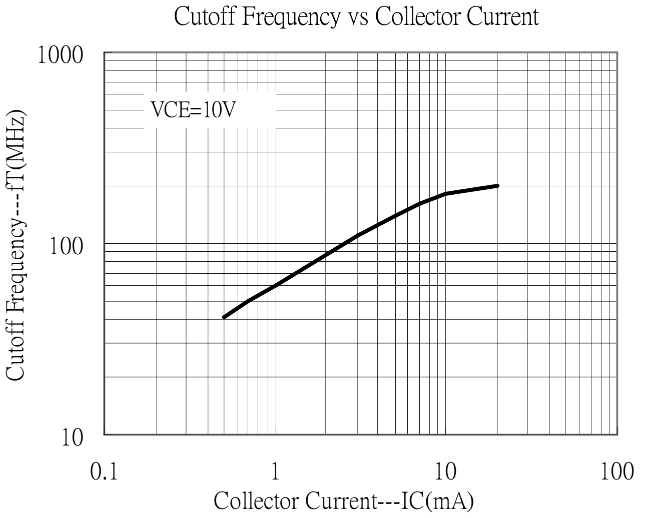

Saturation Voltage vs Collector Current

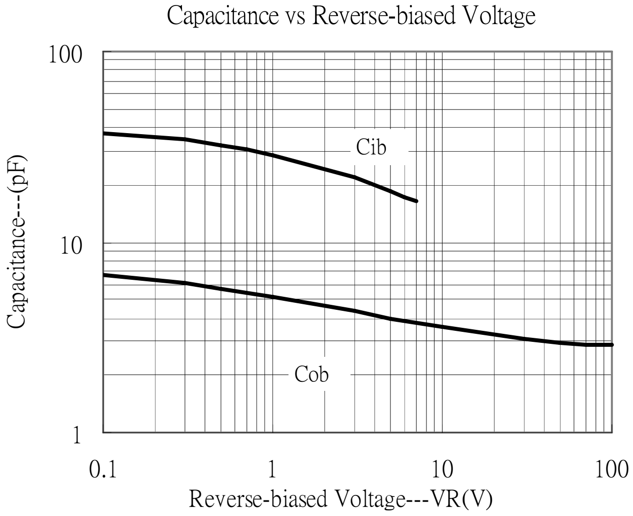

On Voltage vs Collector Current

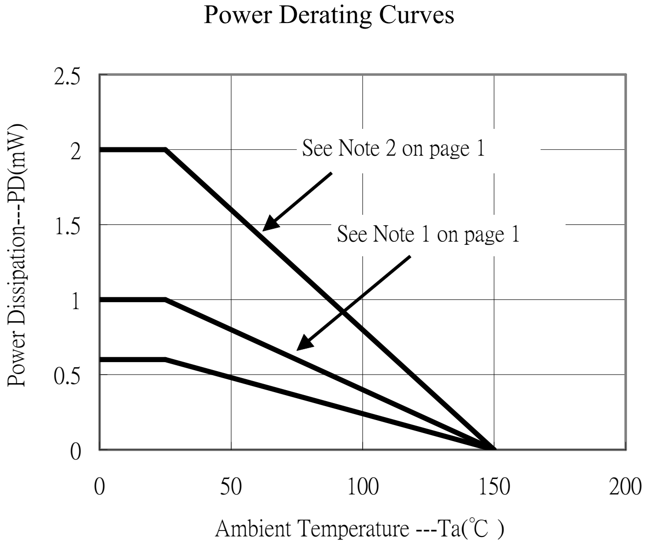
Typical Characteristics(Cont.)



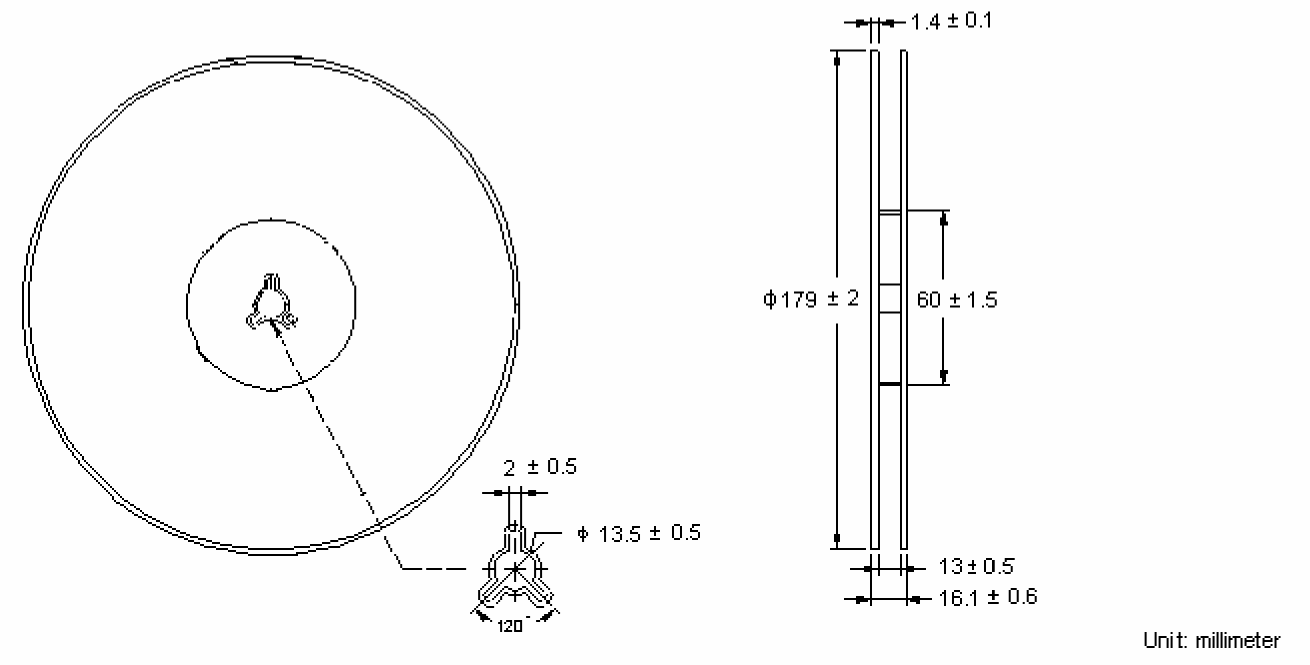




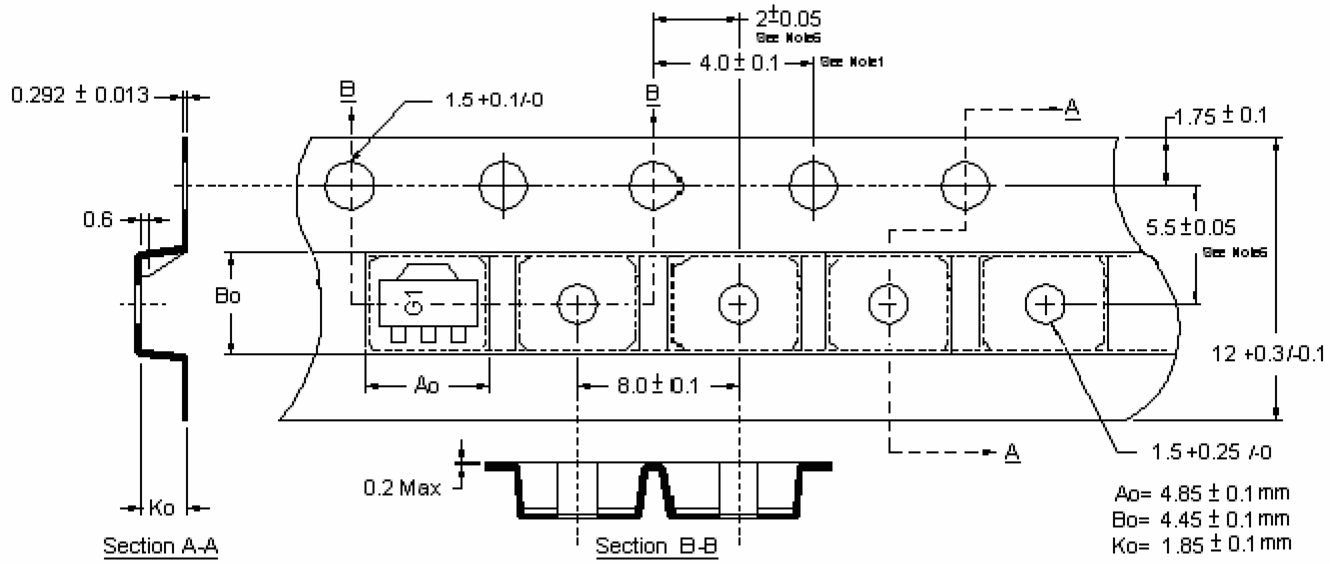




Reel Dimension



Carrier Tape Dimension



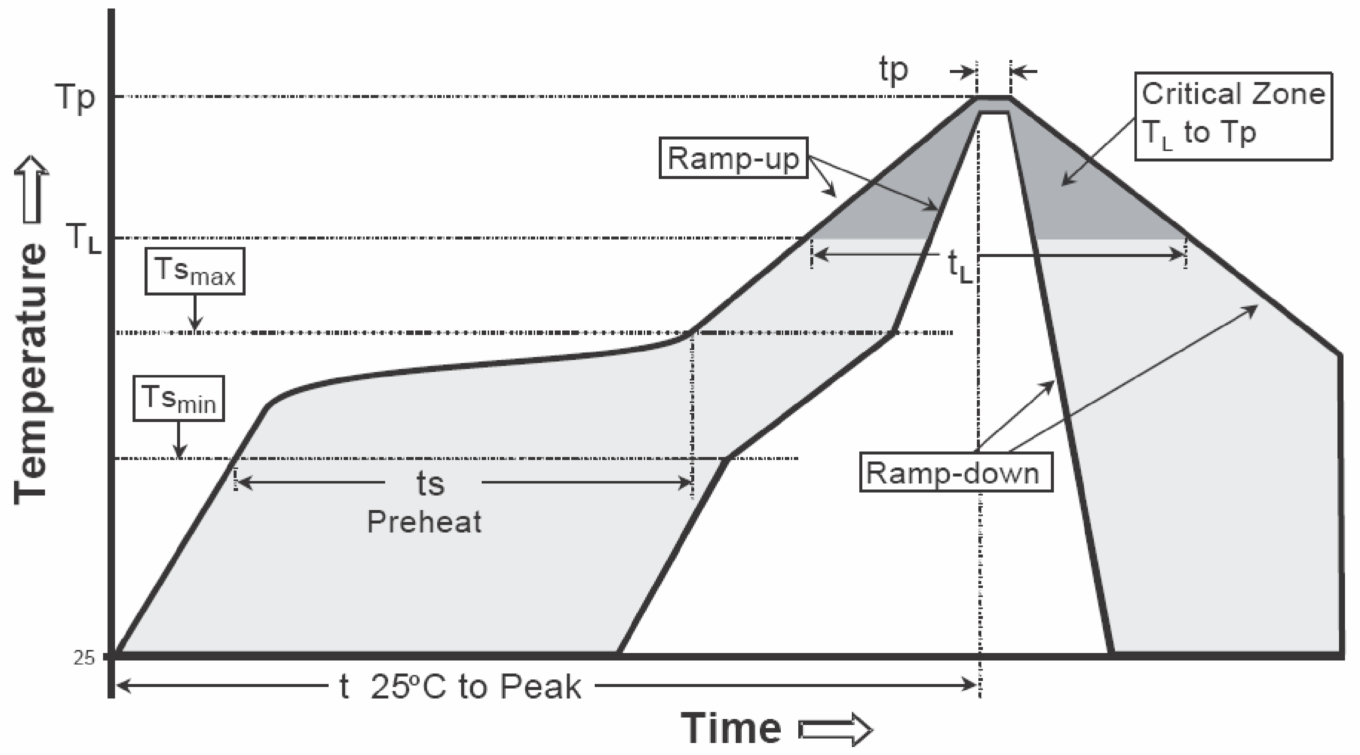
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

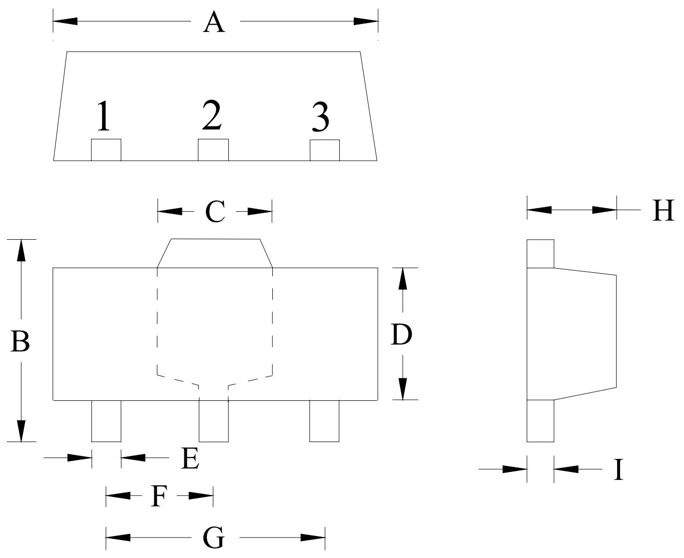
Recommended temperature profile for IR reflow

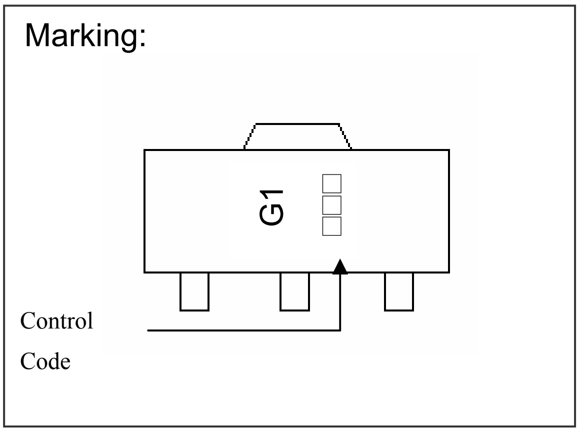


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	183°C 60-150 seconds	217°C 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





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.

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek ***semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.***
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.