NPN Epitaxial Planar Transistor

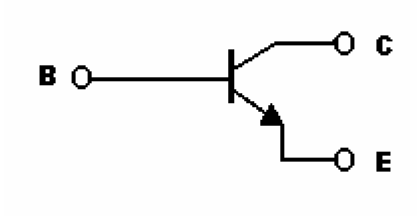
BTD5213M3

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

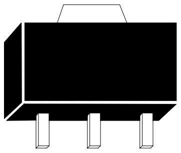
BTD5213M3



B : Base
C : Collector
E : Emitter

Outline

SOT-89



B C E

Absolute Maximum Ratings (Ta=25°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	Pd	0.6	W
		1 (Note 2)	W
		2 (Note 3)	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	208	°C/W
		125 (Note 2)	°C/W
		62.5 (Note 3)	°C/W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

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

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	100	-	-	V	I_C=50μA, I_E=0
BV_{CEO}	100	-	-	V	I_C=1mA, I_B=0
BV_{EBO}	5	-	-	V	I_E=50μA, I_C=0
I_{CBO}	-	-	1	μA	V_{CB}=80V. I_E=0
I_{EBO}	-	-	1	μA	V_{EB}=4V,I_C=0
*$V_{CE(sat)}$	-	-	0.3	V	I_C=500mA, I_B=20mA
*h_{FE}	160	-	400	-	V_{CE}=3V, I_C=100mA
f_T	-	230	-	MHz	V_{CE}=10V, I_C=50mA, f=100MHz
Cob	-	6	-	pF	V_{CB}=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
BTD5213M3-0-T2-G	SOT-89 (Pb-free lead plating and halogen-free package)	1000 pcs / Tape & Reel

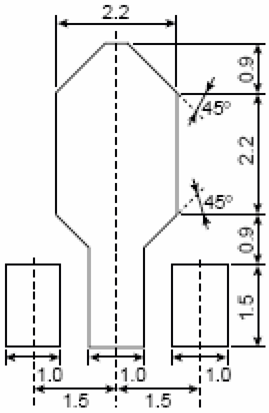
Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T2 :1000 pcs/tape & reel, 7” reel

Product rank, zero for no rank products

Product name

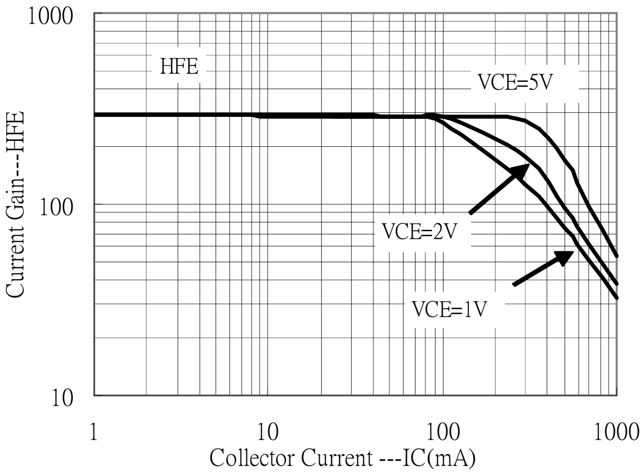
Recommended soldering footprint



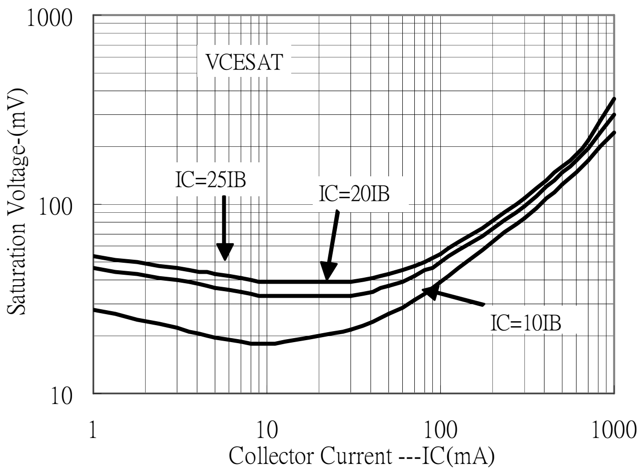
unit : mm

Typical Characteristics

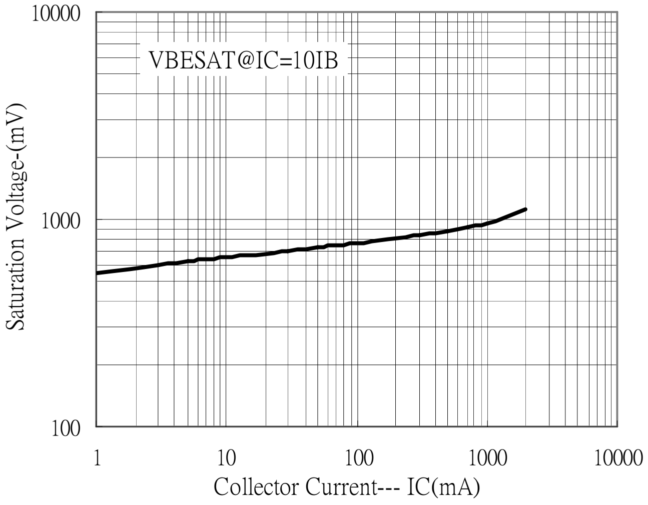
Current Gain vs Collector Current



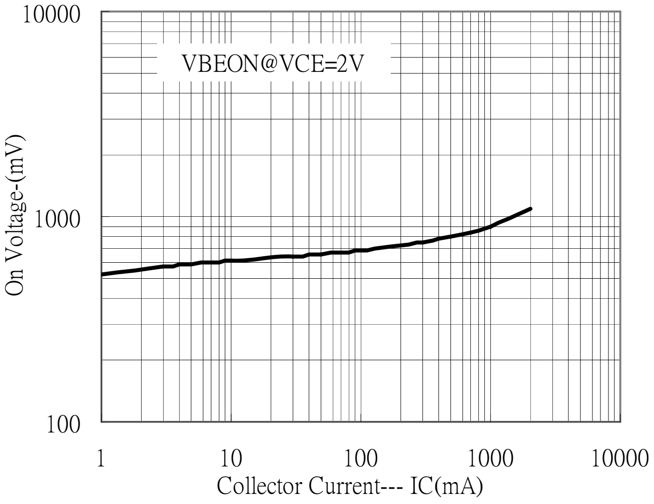
Saturation Voltage vs Collector Current



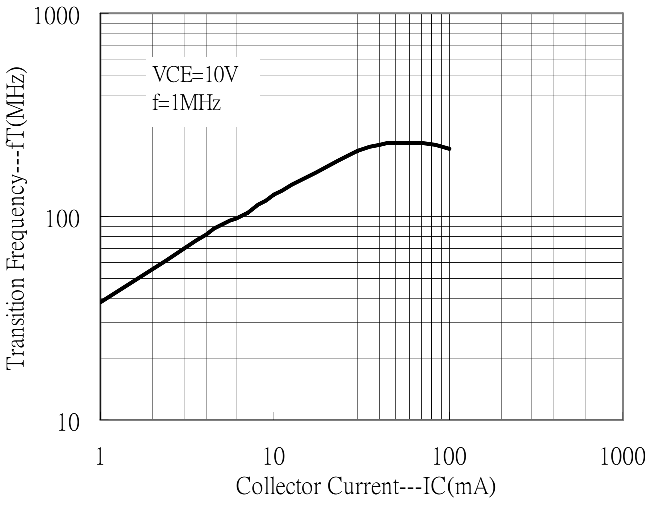
Saturation Voltage vs Collector Current



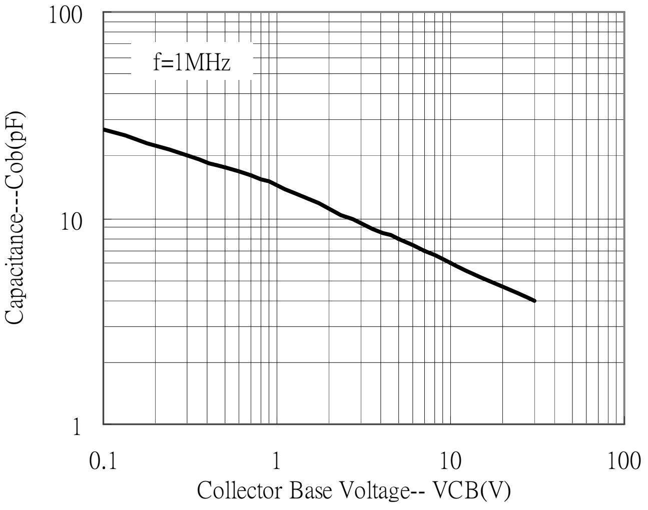
On Voltage vs Collector Current



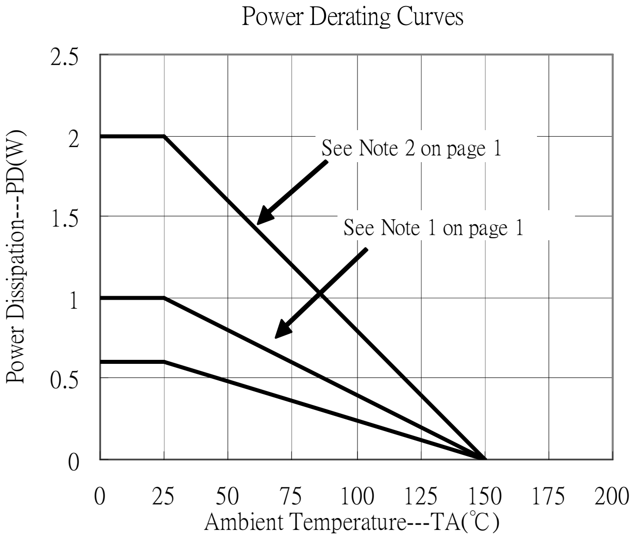
Transition Frequency vs Collector Current



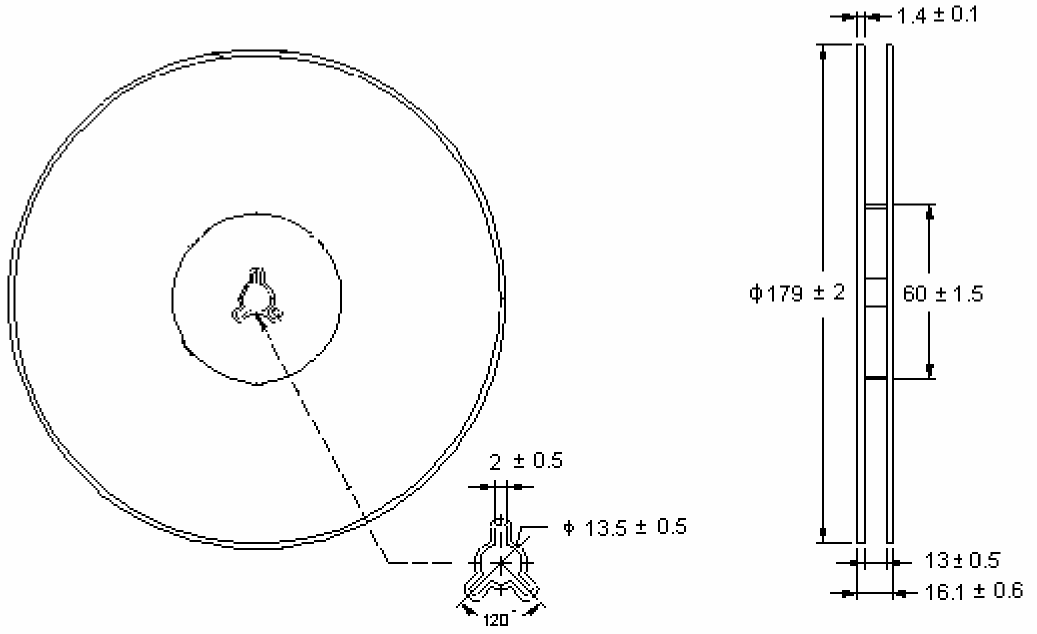
Capacitance Characteristics



Typical Characteristics(Cont.)

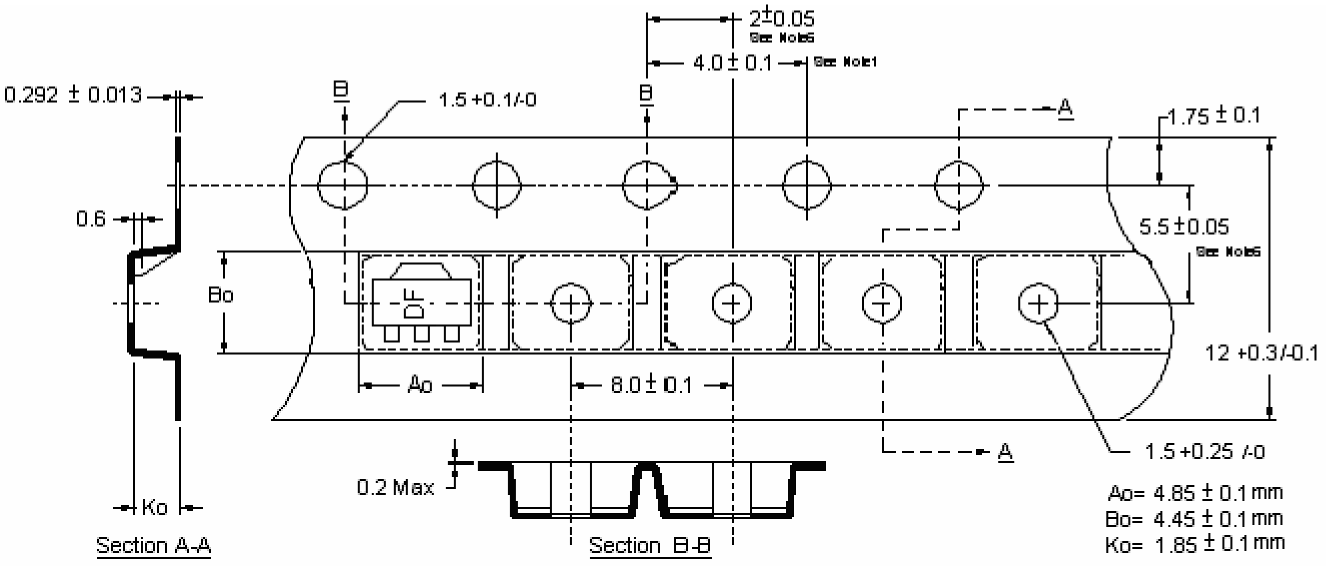


Reel Dimension



Unit: millimeter

Carrier Tape Dimension



Ao= 4.85 ± 0.1 mm
Bo= 4.45 ± 0.1 mm
Ko= 1.85 ± 0.1 mm

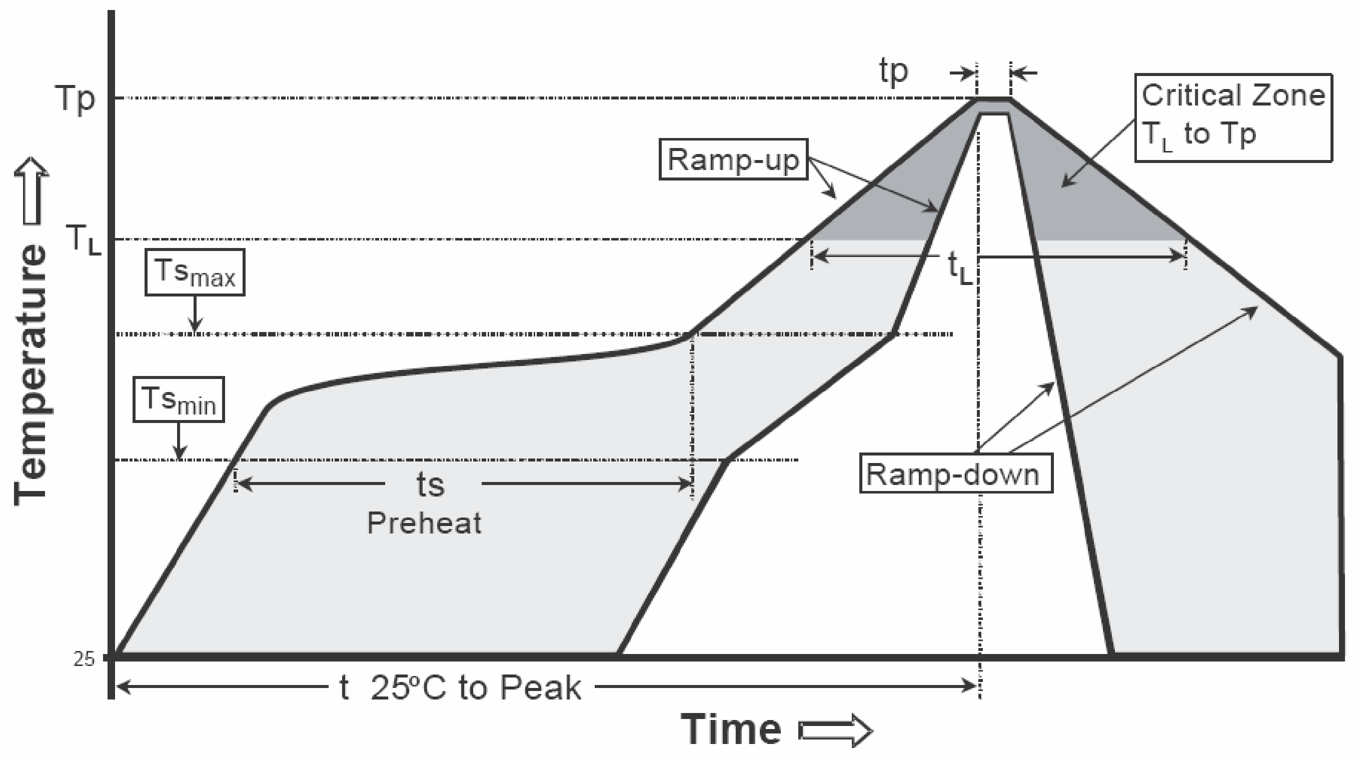
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of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

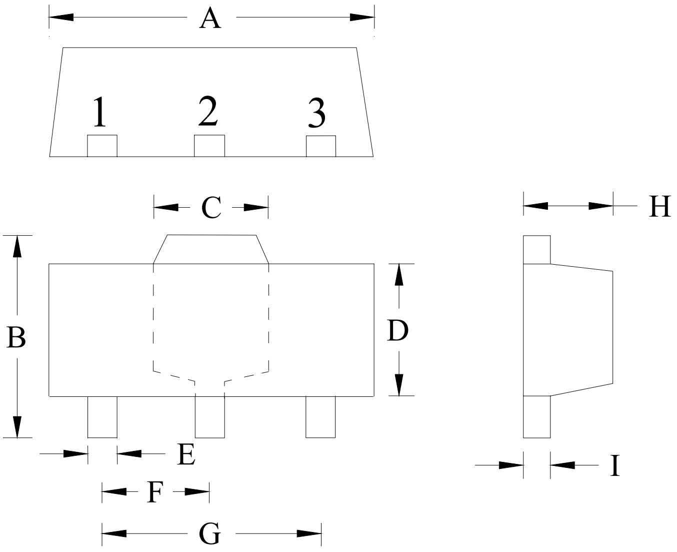
Recommended temperature profile for IR reflow

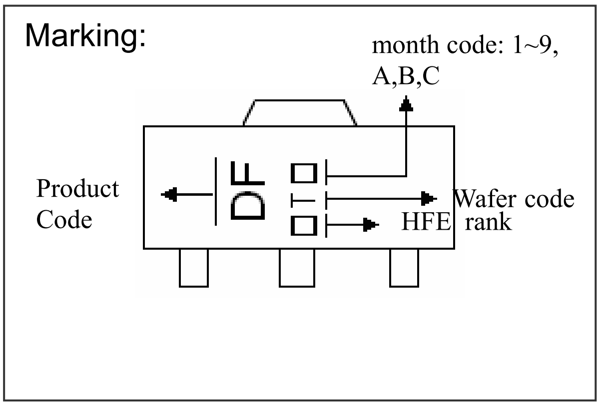


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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