Low Vcesat PNP Epitaxial Planar Transistor

BTB5140N3

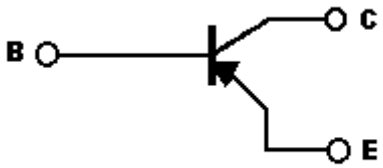
BV_{CEO}	-40V
I_C	-2A
$R_{CESAT(TYP)}$	0.22Ω

Features

- Low V_{CE}(sat), V_{CE}(sat)=-0.25V (max), at I_C / I_B =- 500mA /- 50mA
- Pb-free lead plating and halogen-free package

Symbol

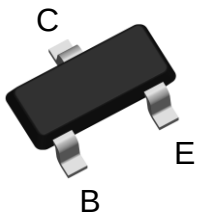
BTB5140N3



B：Base
C：Collector
E：Emitter

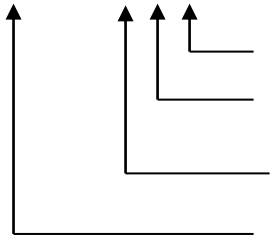
Outline

SOT-23



Ordering Information

Device	Package	Shipping
BTB5140N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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

Packing spec, T1 :3000 pcs/tape & reel, 7” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits		Unit
Collector-Base Voltage	V_{CBO}	-40		V
Collector-Emitter Voltage	V_{CEO}	-40		
Emitter-Base Voltage	V_{EBO}	-5		
Collector Current(DC)	I_C	-2		A
Peak Collector Current	I_{CM}	-4	*1	
Peak Base Current	I_{BM}	-1		
Power Dissipation	P_D	300	*2	mW
		450	*3	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	*2	°C/W
		278	*3	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	39		
Operating Junction and Storage Temperature Range	Tj;Tstg	-65~+150		°C

Note :1 Single pulse, Pw=10ms

2 When mounted on a FR-4 PCB, single-sided copper, tinplated and standard footprint.

3 When mounted on a FR-4 PCB, single-sided copper, tinplated and mounting pad for collector 1 cm^2.

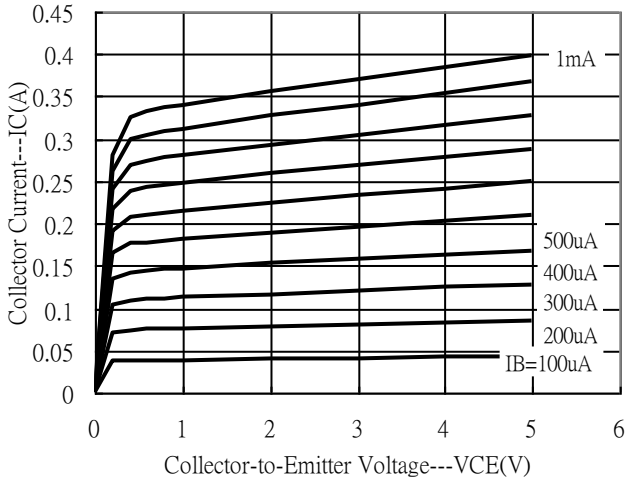
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	-40	-	-	V	I_C=-50μA, I_E=0
BV_{CEO}	-40	-	-	V	I_C=-1mA, I_B=0
BV_{EBO}	-5	-	-	V	I_E=-50μA, I_C=0
I_{CBO}	-	-	-100	nA	V_{CB}=-40V, I_E=0
I_{CEO}	-	-	-1	μA	V_{CE}=-30V, I_E=0
I_{EBO}	-	-	-100	nA	V_{EB}=-5V, I_C=0
*$V_{CE(sat)}$	-	-75	-200	mV	I_C=-100mA, I_B=-1mA
*$V_{CE(sat)}$	-	-110	-250	mV	I_C=-500mA, I_B=-50mA
*$V_{CE(sat)}$	-	-196	-400	mV	I_C=-1A, I_B=-100mA
*$R_{CE(sat)}$	-	220	500	mΩ	I_C=-500mA, I_B=-50mA
*$V_{BE(sat)}$	-	-860	-1	V	I_C=-1A, I_B=-50mA
*$V_{BE(on)}$	-	-762	-0.9	V	V_{CE}=-5V, I_C=-1A
*h_{FE} 1	300	464	-	-	V_{CE}=-5V, I_C=-1mA
*h_{FE} 2	300	427	600	-	V_{CE}=-5V, I_C=-100mA
*h_{FE} 3	250	360	-	-	V_{CE}=-5V, I_C=-500mA
*h_{FE} 4	160	300	-	-	V_{CE}=-5V, I_C=-1A
f_T	-	75	-	MHz	V_{CE}=-5V, I_C=-10mA, f=100MHz
Cob	-	20	-	pF	V_{CB}=-10V, f=1MHz

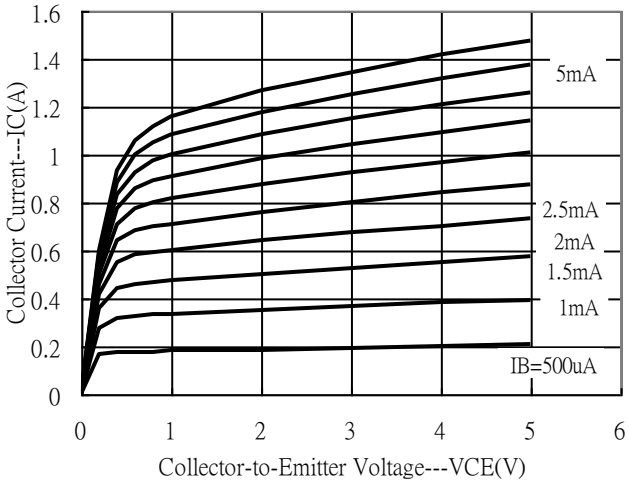
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

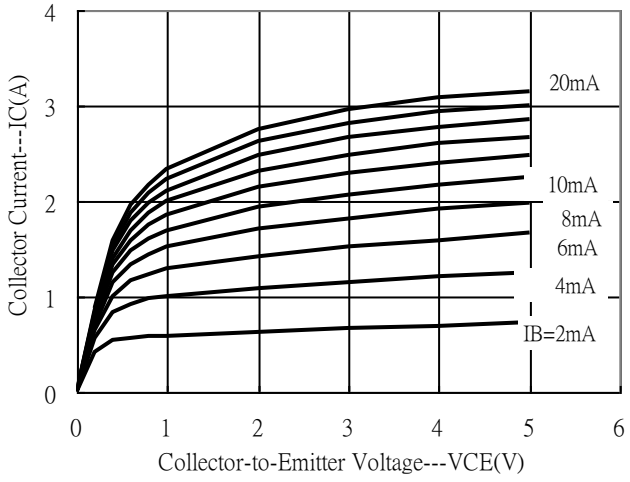
Emitter Grounded Output Characteristics



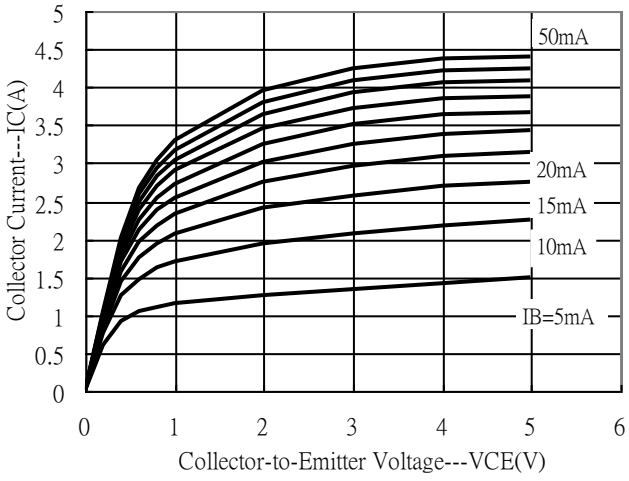
Emitter Grounded Output Characteristics



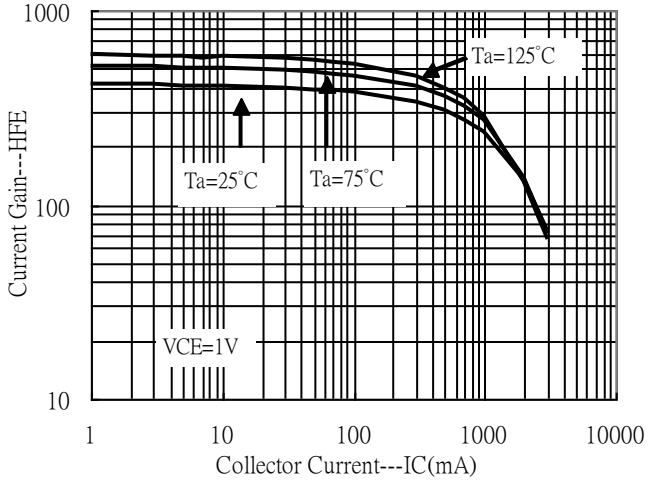
Emitter Grounded Output Characteristics



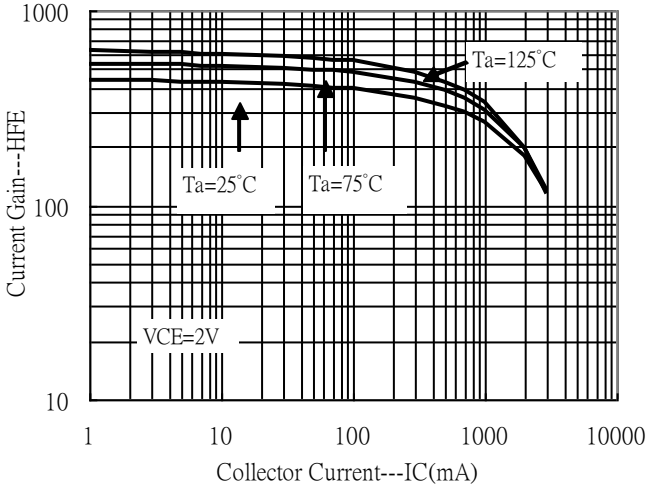
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

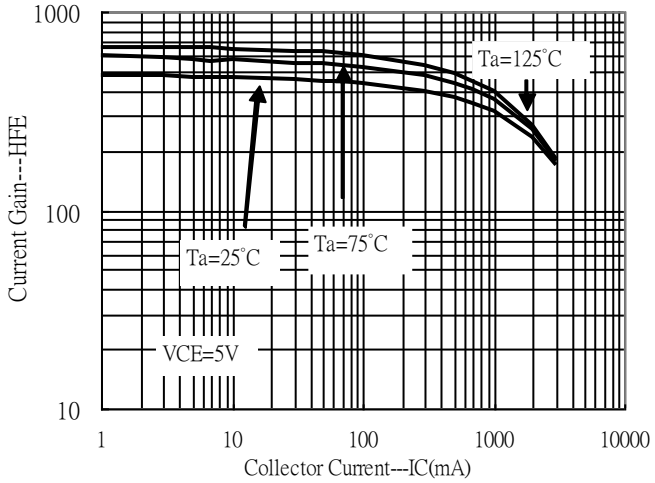


Current Gain vs Collector Current

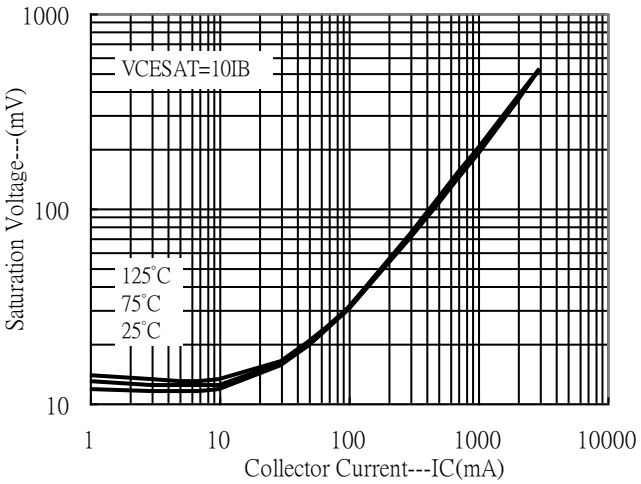


Typical Characteristics(Cont.)

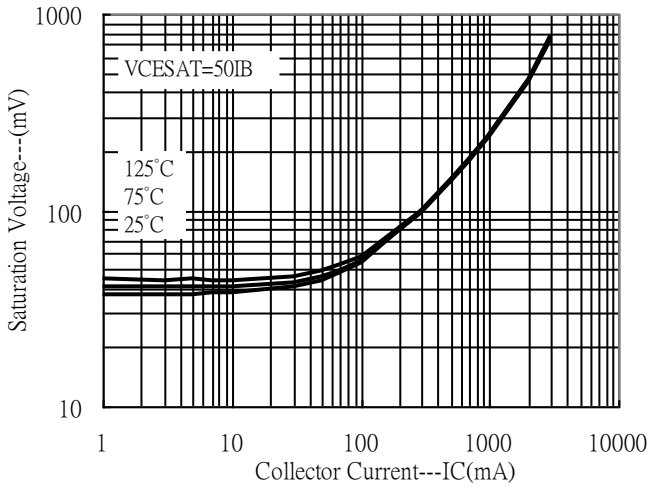
Current Gain vs Collector Current



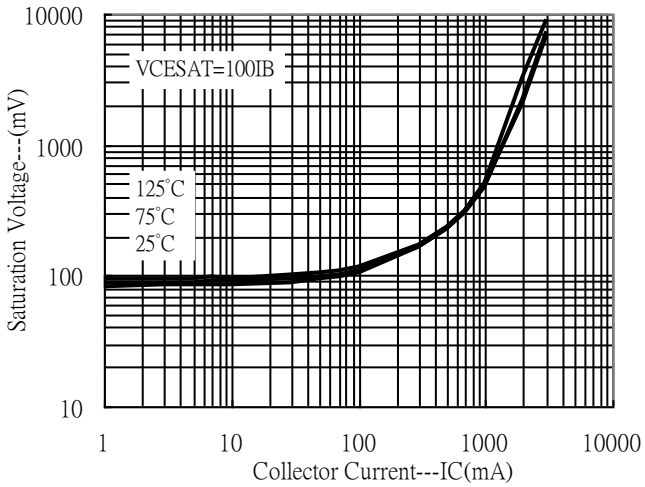
Saturation Voltage vs Collector Current



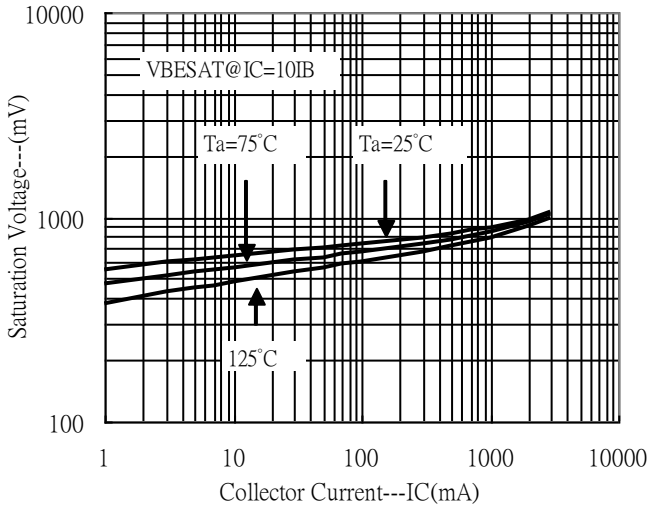
Saturation Voltage vs Collector Current



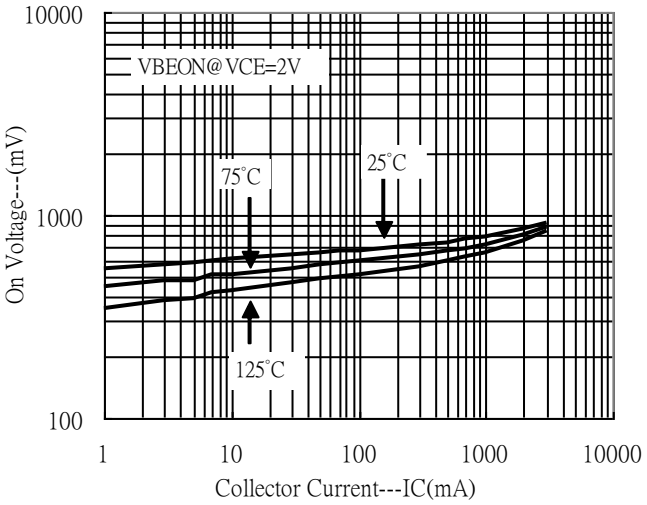
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

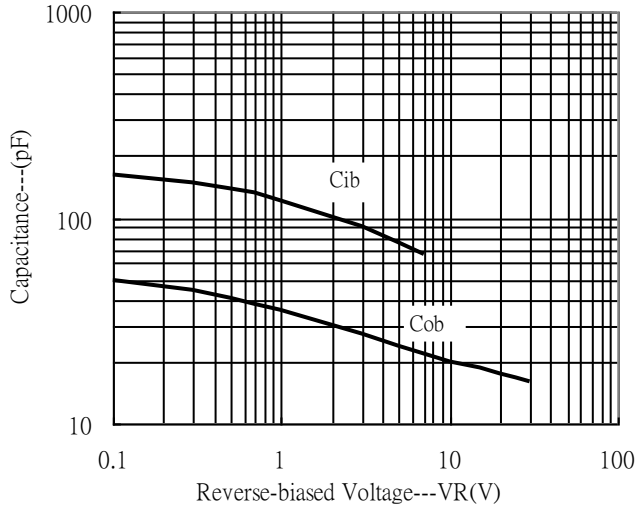


On Voltage vs Collector Current

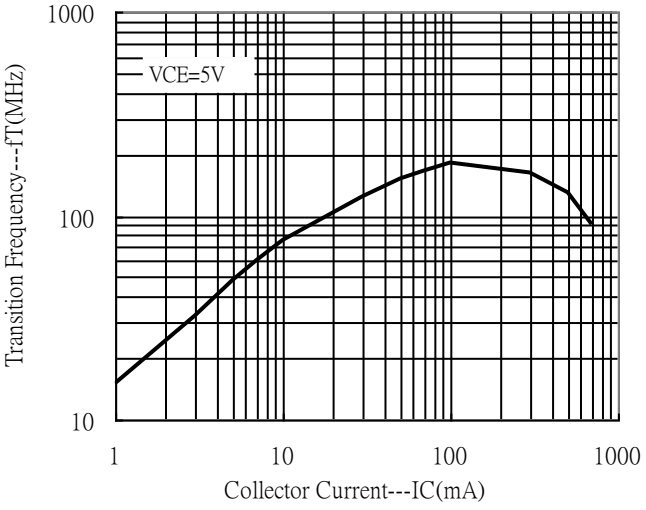


Typical Characteristics(Cont.)

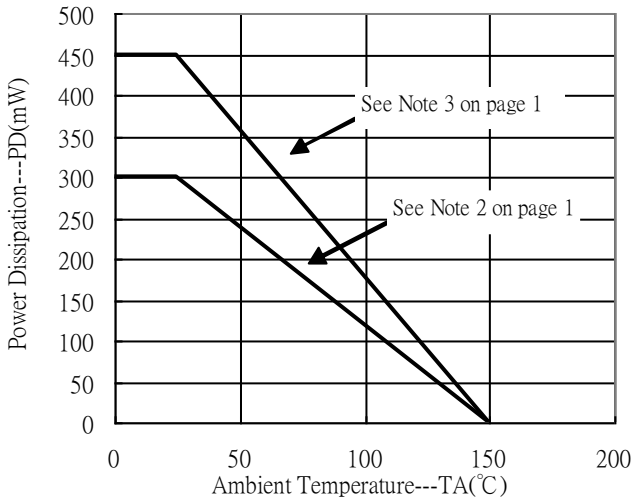
Capacitance vs Reverse-biased Voltage



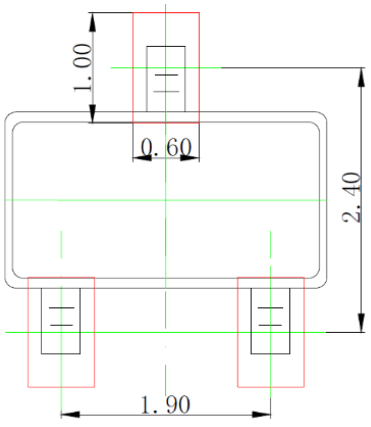
Transition Frequency vs Collector Current



Power Derating Curves

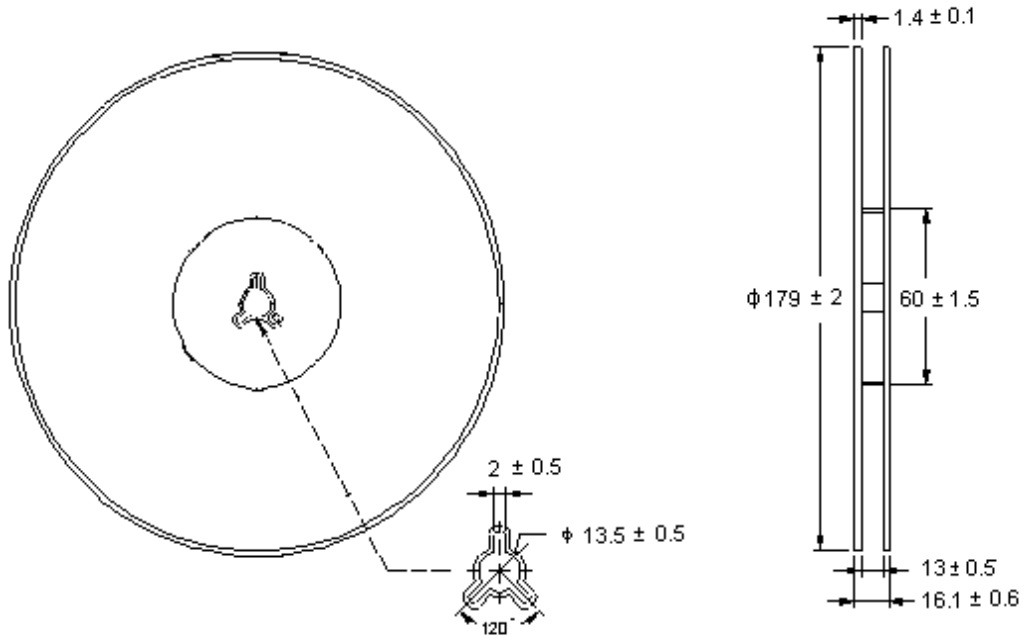


Recommended Soldering Footprint



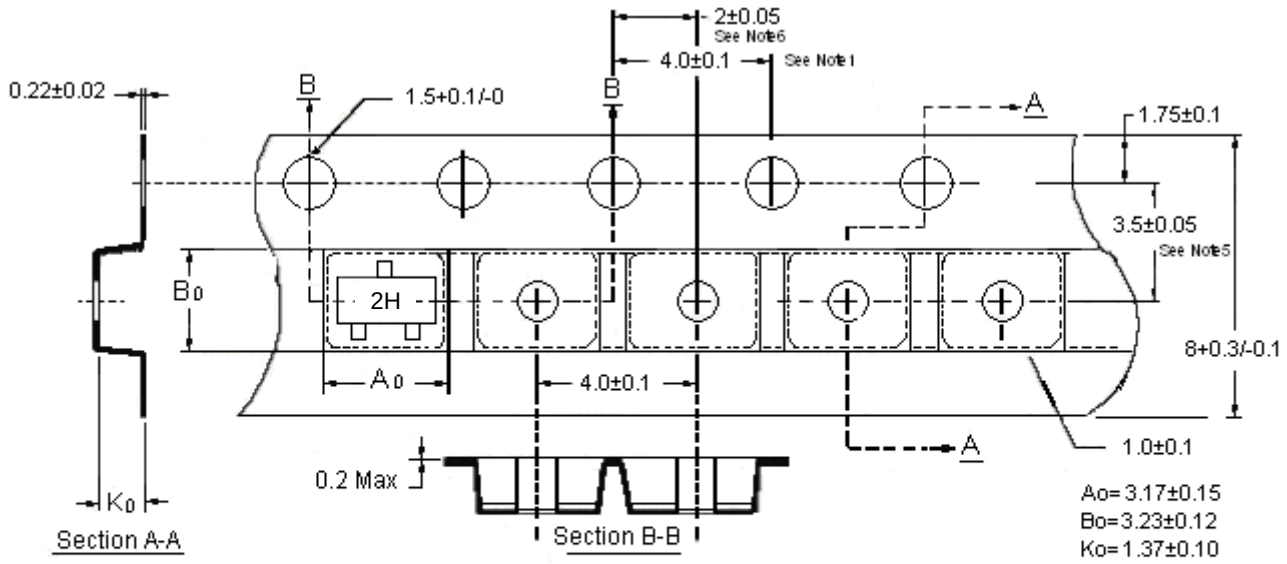
Unit : mm

Reel Dimension



Unit: millimeter

Carrier Tape Dimension



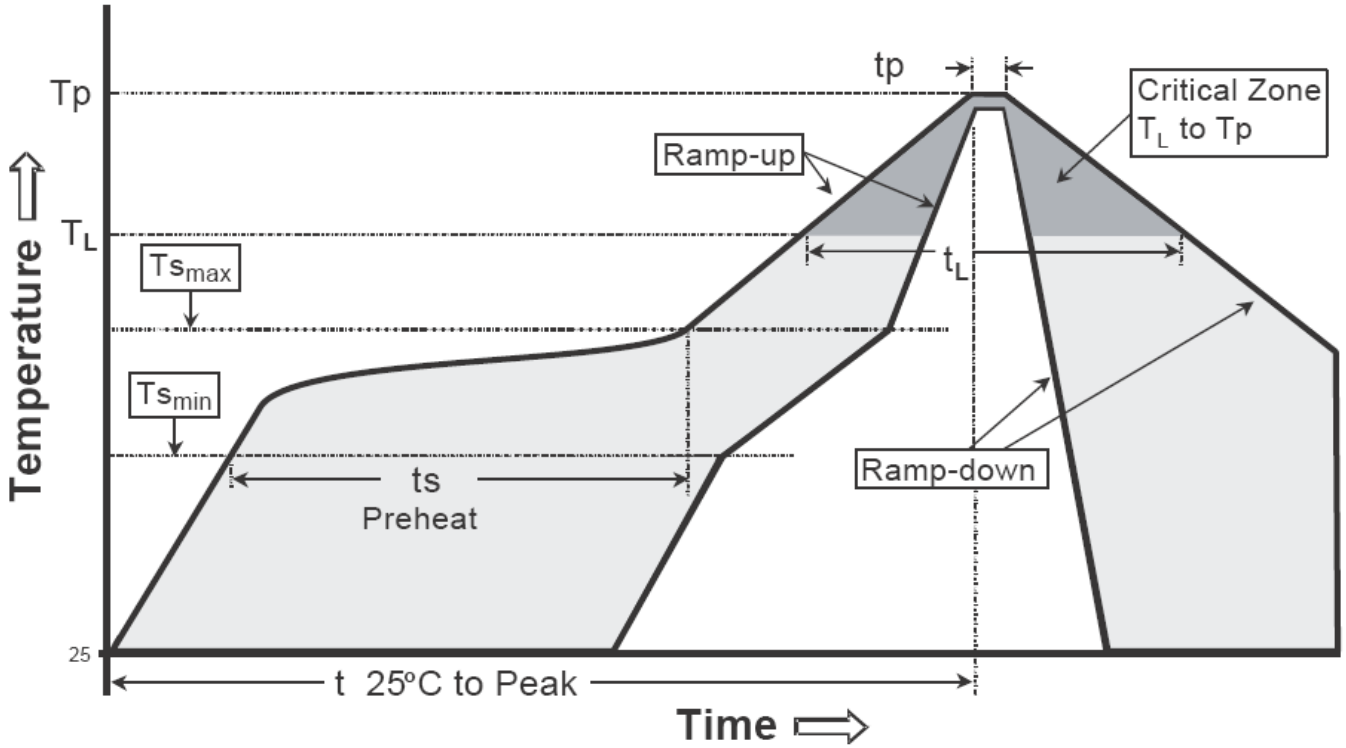
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

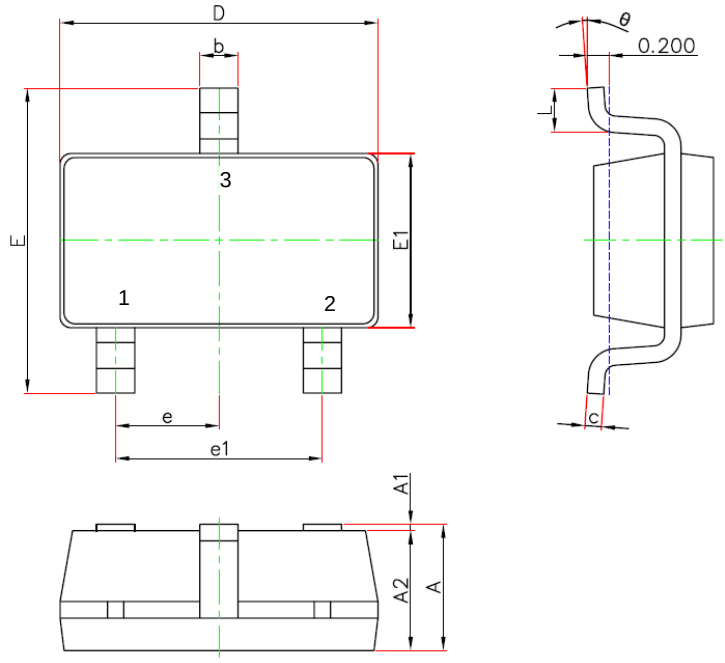
Recommended temperature profile for IR reflow

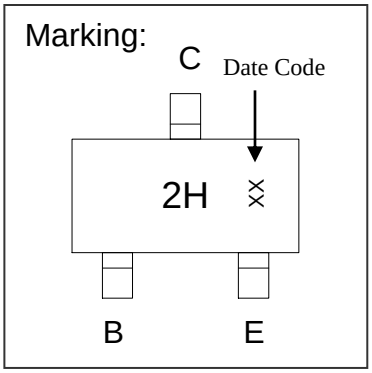


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-23 Dimension





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

Date Code: Year+Month
Year: 3→2003, 4→2004
Month: 1→1, 2→2, • • •
9→9, A→10, B→11, C→12

3-Lead SOT-23 Plastic
Surface Mounted Package
CYStek Package Code: N3

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.041	0.049	1.05	1.25	E1	0.059	0.067	1.50	1.70
A1	0.000	0.004	0.00	0.10	E	0.104	0.116	2.65	2.95
A2	0.041	0.045	1.05	1.15	e	0.037 BSC		0.95 BSC	
b	0.012	0.020	0.30	0.50	e1	0.071	0.079	1.80	2.00
c	0.004	0.008	0.10	0.20	L	0.012	0.024	0.30	0.60
D	0.111	0.119	2.82	3.02	θ	0°	8°	0°	8°

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.