Low $V_{CE(sat)}$ NPN Epitaxial Planar Transistor

BTD2150N3

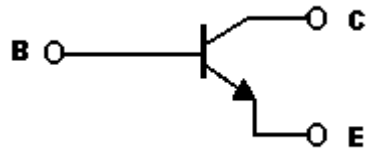
BV_{CEO}	50V
I_C	4A
$R_{CE(SAT)}$ typ.	90mΩ

Features

- Low $V_{CE(sat)}$, typically 0.18V at I_C / I_B = 2A / 0.1A
- Excellent current gain characteristics
- Complementary to BTB1424N3
- Pb-free lead plating and halogen-free package

Symbol

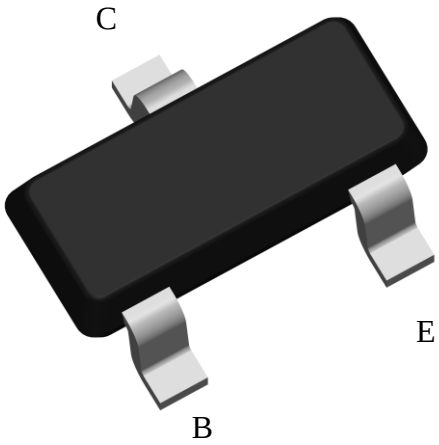
BTD2150N3



B：Base
C：Collector
E：Emitter

Outline

SOT-23



Ordering Information

Device	Package	Shipping
BTD2150N3-X-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	Limit	Unit
Collector-Base Voltage	V_{CBO}	80	V
Collector-Emitter Voltage	V_{CEO}	50	
Emitter-Base Voltage	V_{EBO}	6	
Collector Current (DC)	I_C	4	A
Collector Current (Pulse)	I_{CP}	7 (Note 1)	
Power Dissipation	P_D	225	mW
		660 (Note 2)	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
		190	
Operating Junction and Storage Temperature Range	Tj ; Tstg	-55~+150	°C

Note : 1. Single Pulse Pw≦350μs, Duty≦2%.

2. Device mounted on an FR-4 PCB, single sided copper, tin plated, mounting pad for collector 1cm².

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	80	-	-	V	I_C=100μA, I_E=0
BV_{CEO}	50	-	-	V	I_C=1mA, I_B=0
BV_{EBO}	6	-	-	V	I_E=50μA, I_C=0
I_{CBO}	-	-	100	nA	V_{CB}=80V, I_E=0
I_{EBO}	-	-	100	nA	V_{EB}=6V, I_C=0
*$V_{CE(sat)}$	-	40	100	mV	I_C=400mA, I_B=20mA
*$V_{CE(sat)}$	-	160	220	mV	I_C=1A, I_B=10mA
*$V_{CE(sat)}$	-	180	320	mV	I_C=2A, I_B=100mA
*$R_{CE(sat)}$	-	90	160	mΩ	I_C=2A, I_B=100mA
*$V_{BE(sat)}$	-	0.94	1.3	V	I_C=2A, I_B=200mA
*$h_{FE}1$	200	-	-	-	V_{CE}=2V, I_C=100mA
*$h_{FE}2$	270	-	820	-	V_{CE}=2V, I_C=500mA
*$h_{FE}3$	100	-	-	-	V_{CE}=2V, I_C=1A
f_T	-	175	-	MHz	V_{CE}=1V, I_C=0.1A, f=100MHz
Cob	-	14	-	pF	V_{CB}=10V, f=1MHz

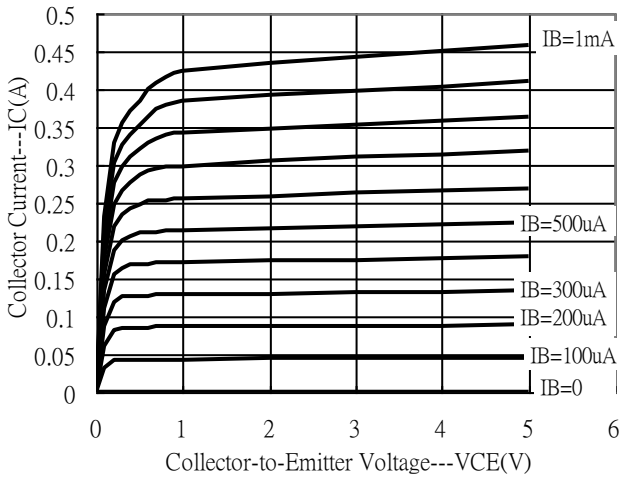
*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

Classification Of h_{FE} 2

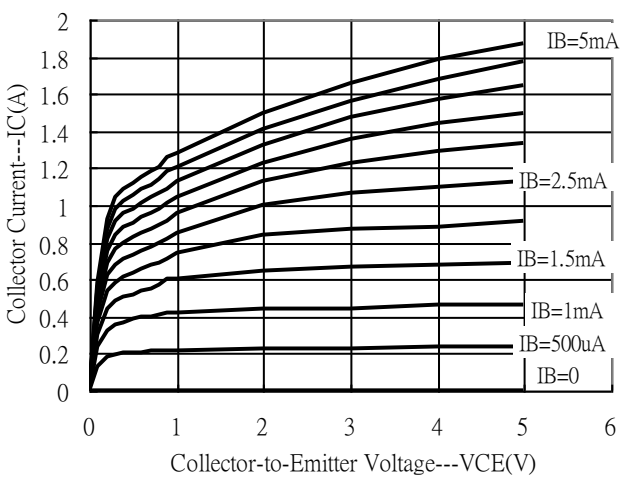
Rank	S	T
Range	270~560	390~820

Typical Characteristics

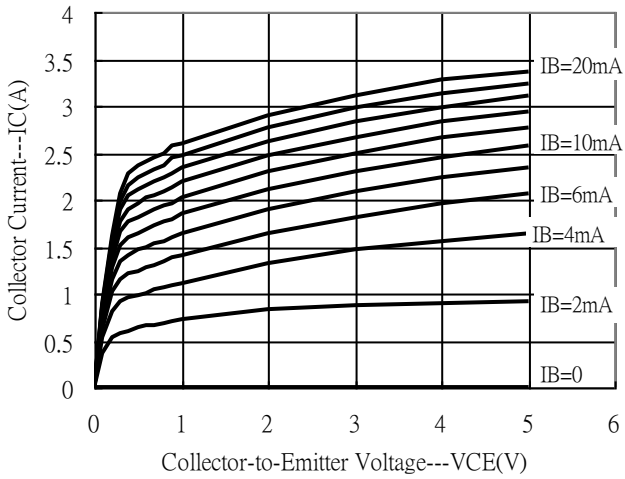
Emitter Grounded Output Characteristics



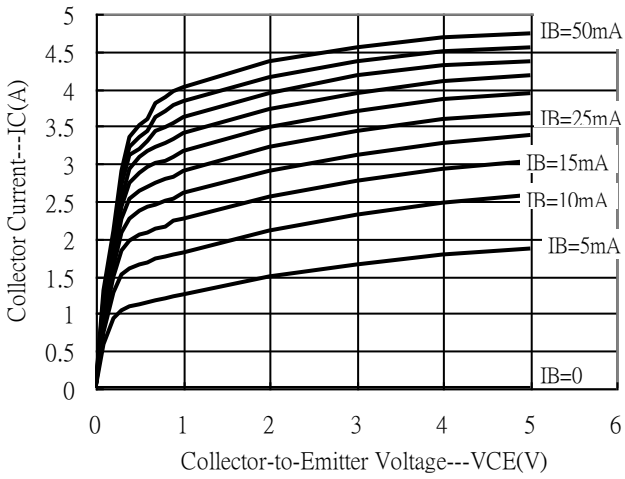
Emitter Grounded Output Characteristics



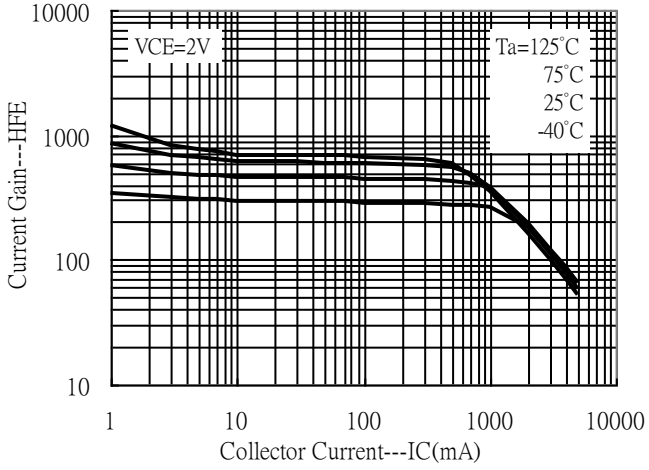
Emitter Grounded Output Characteristics



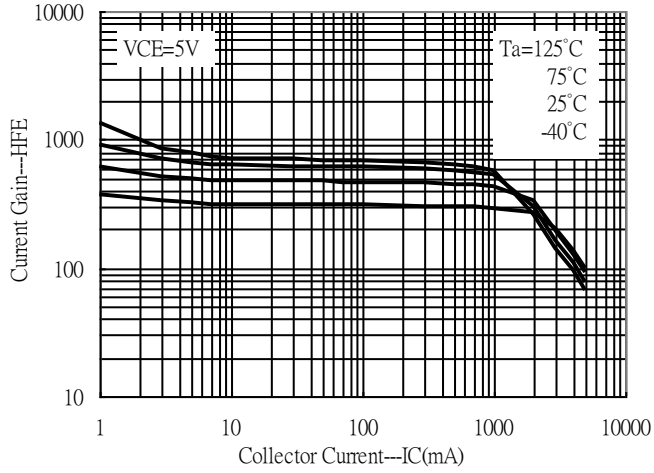
Emitter Grounded Output Characteristics



Current Gain vs Collector Current

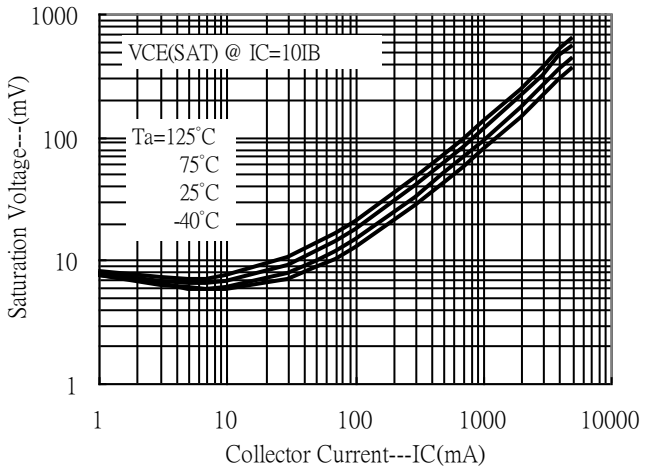


Current Gain vs Collector Current

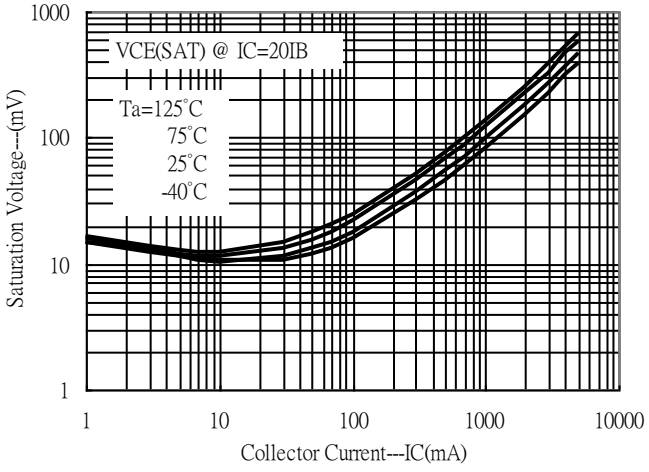


Typical Characteristics(Cont.)

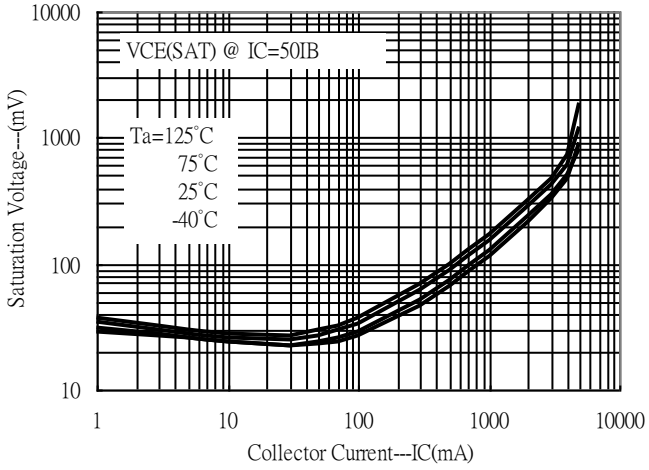
Saturation Voltage vs Collector Current



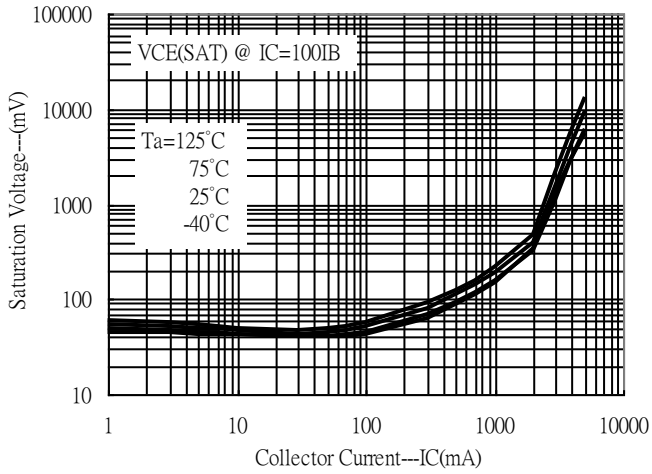
Saturation Voltage vs Collector Current



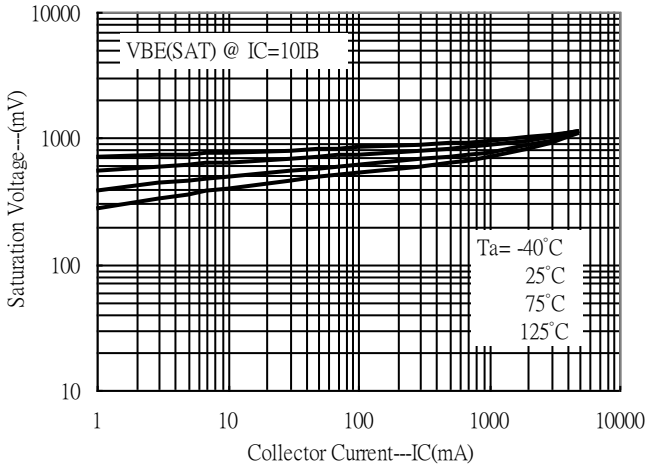
Saturation Voltage vs Collector Current



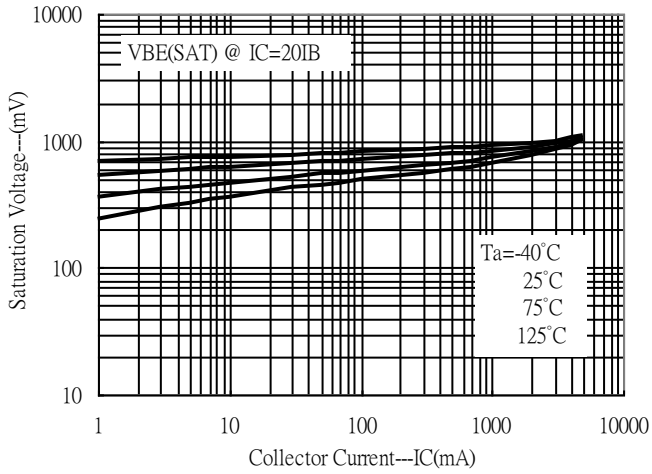
Saturation Voltage vs Collector Current



Saturation Voltage vs Collector Current

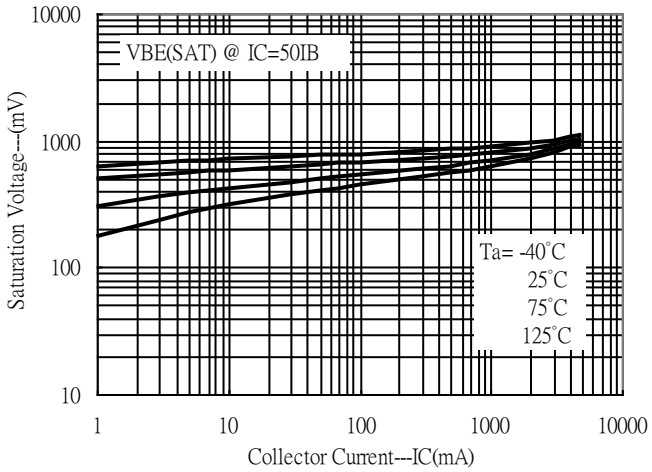


Saturation Voltage vs Collector Current

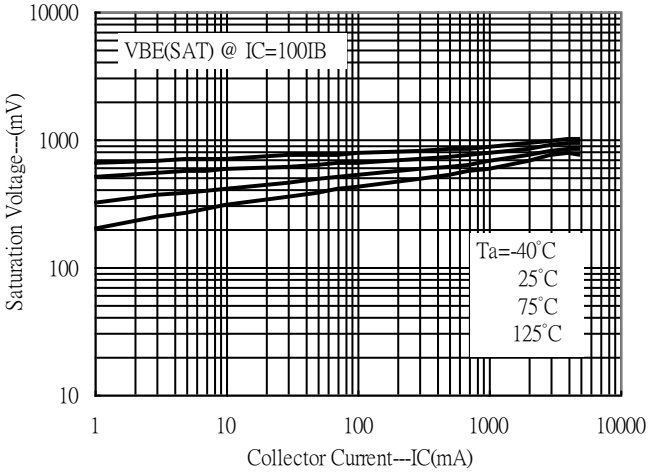


Typical Characteristics(Cont.)

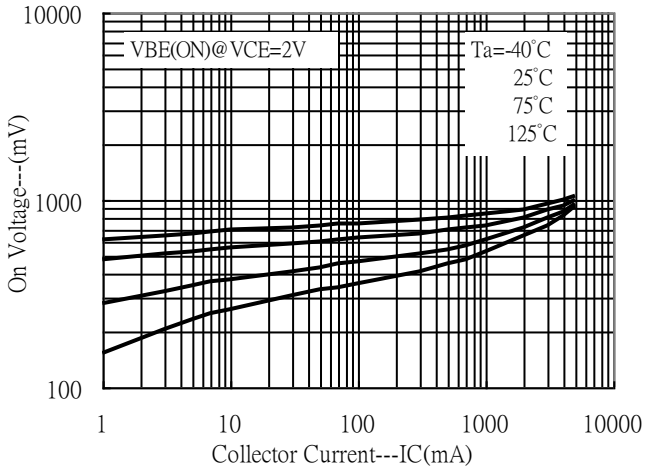
Saturation Voltage vs Collector Current



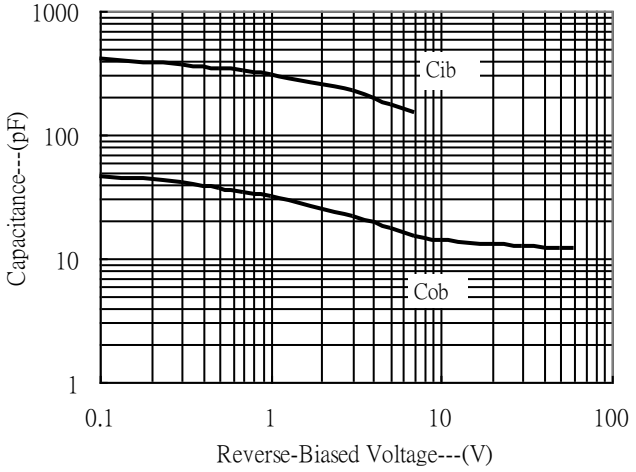
Saturation Voltage vs Collector Current



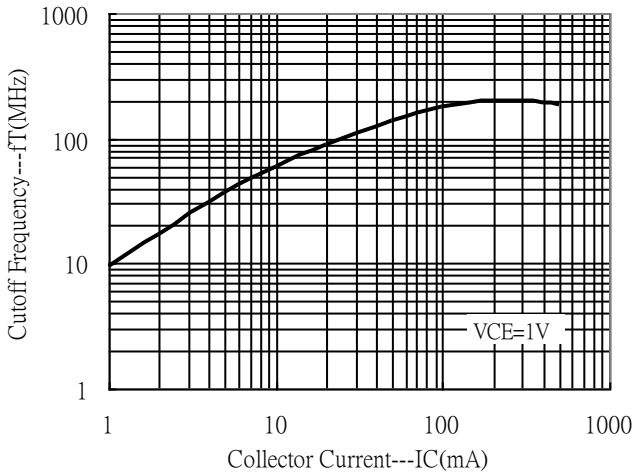
On Voltage vs Collector Current



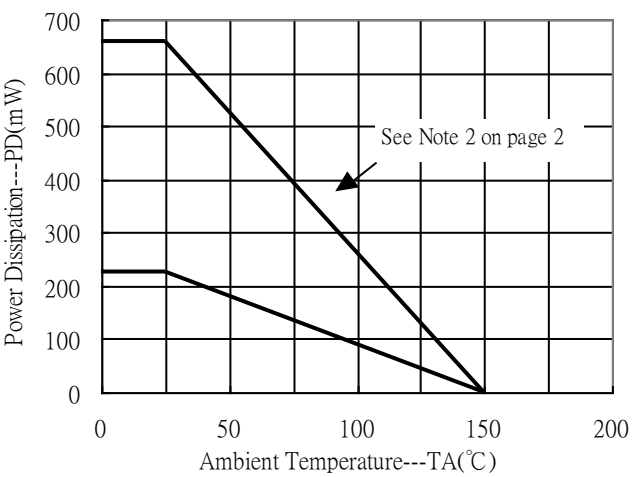
Capacitance vs Reverse-Biased Voltage



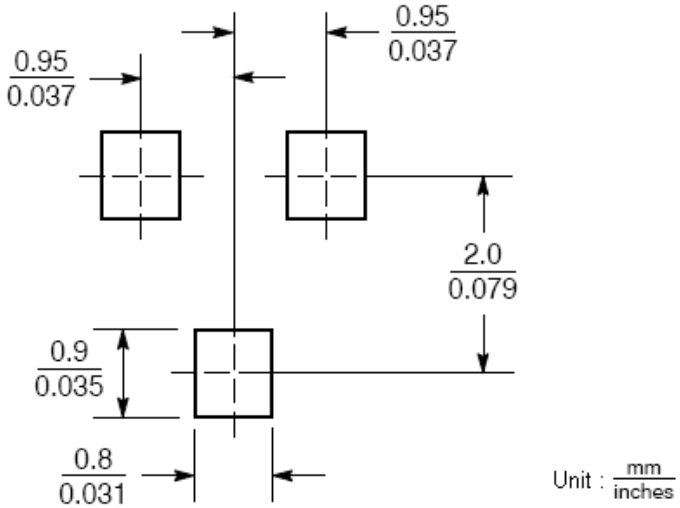
Cutoff frequency vs Collector Current



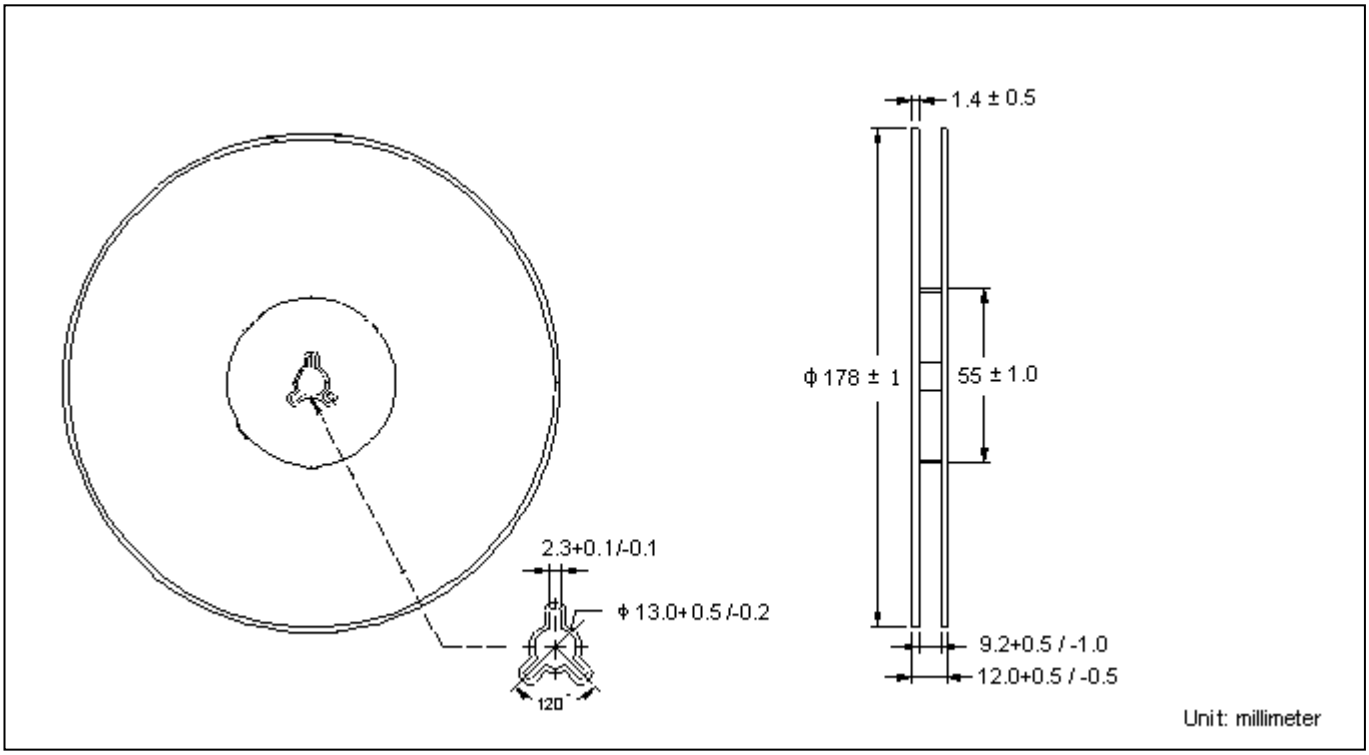
Power Derating Curve



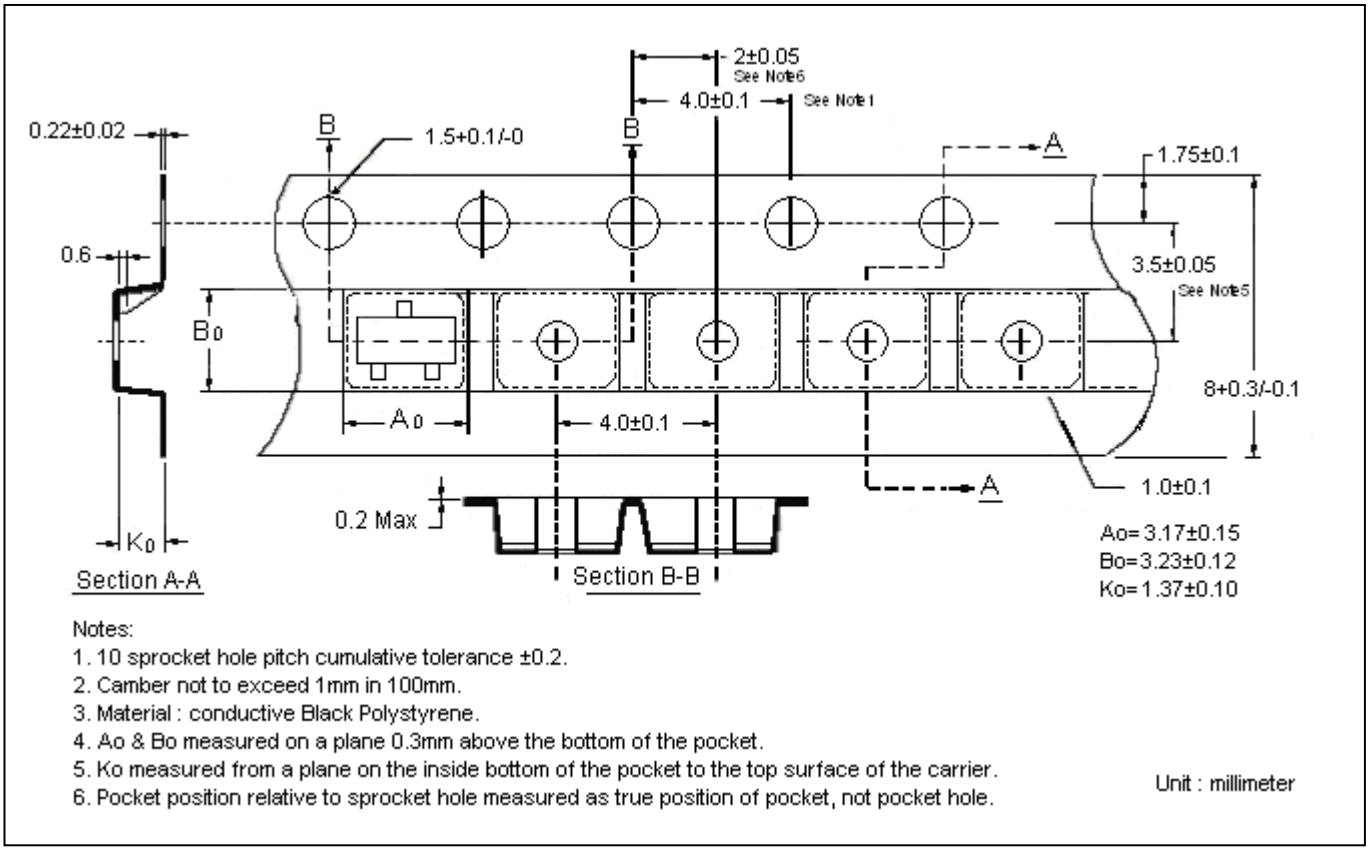
Recommended Soldering Footprint



Reel Dimension



Carrier Tape Dimension



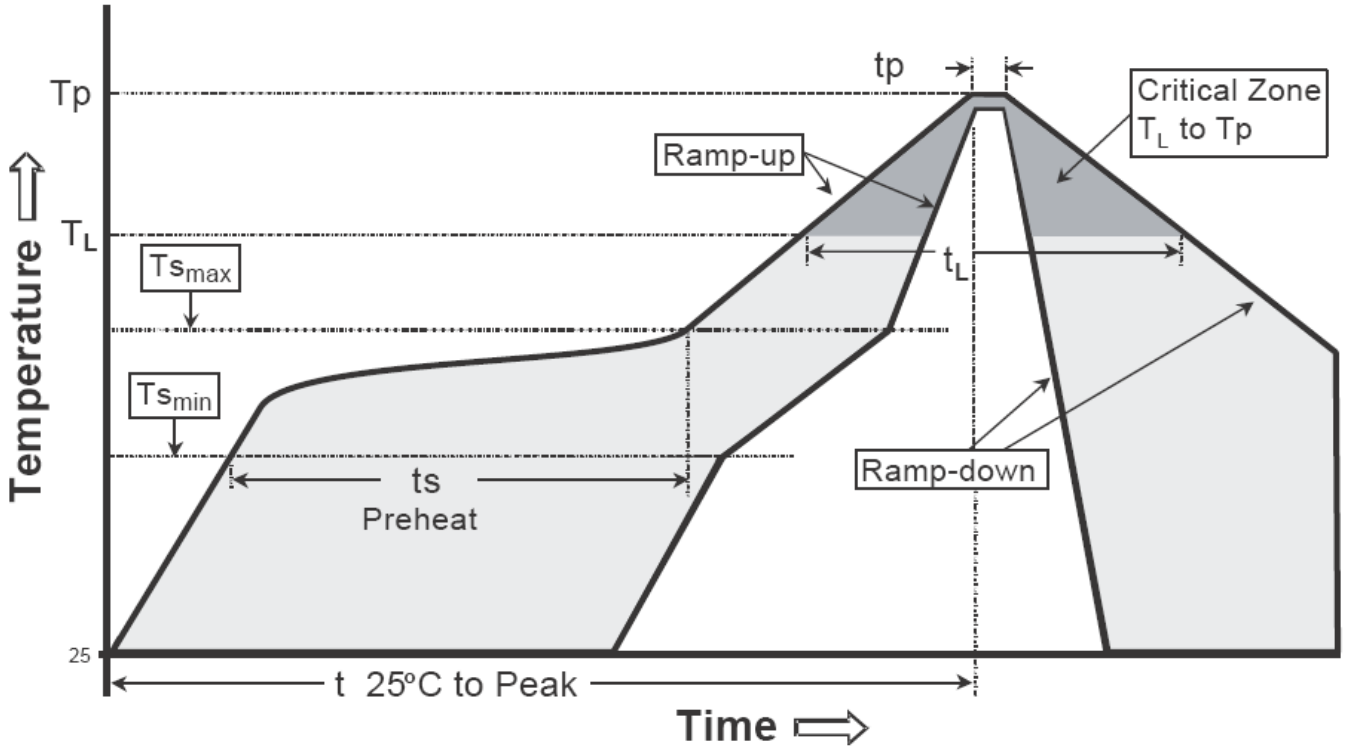
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

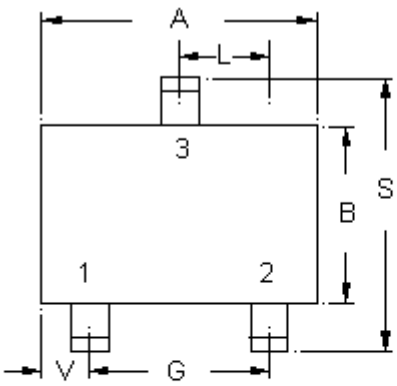
Recommended temperature profile for IR reflow

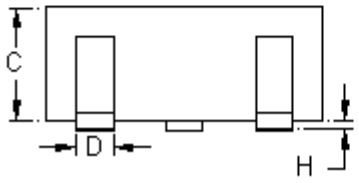


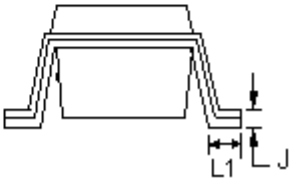
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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

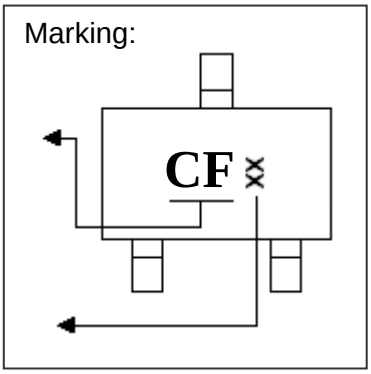






Product Code

Marking:



Date Code: Year+Month
Year: 7→2017, 8→2018
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

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1110	0.1189	2.82	3.02	J	0.0039	0.0079	0.10	0.20
B	0.0590	0.0669	1.50	1.70	L	0.0374 TYP		0.95 TYP	
C	0.0413	0.0453	1.05	1.15	L1	0.0118	0.0236	0.30	0.60
D	0.0118	0.0197	0.30	0.50	S	0.1043	0.1161	2.65	2.95
G	0.0709	0.0787	1.80	2.00	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10					

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