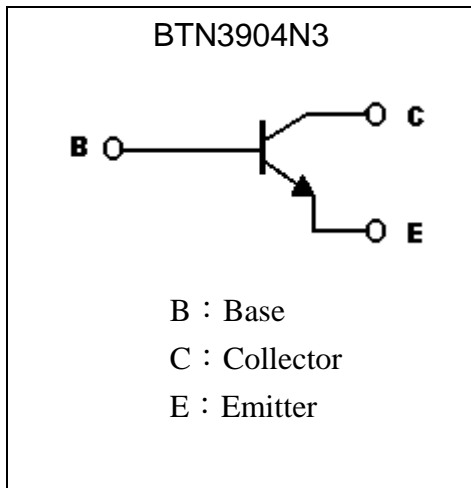
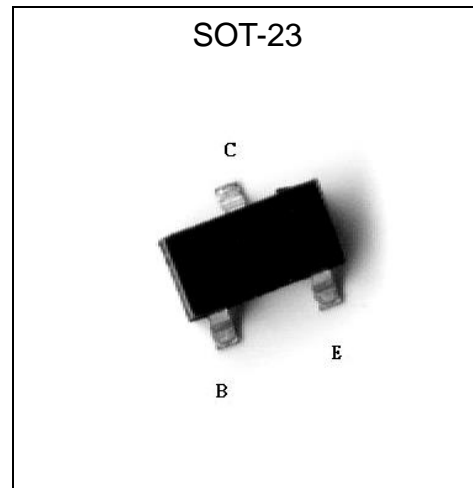


General Purpose NPN Epitaxial Planar Transistor

BTN3904N3

Description

- The BTN3904N3 is designed for general purpose switching amplifier applications.
- Complementary to BTP3906N3.
- ESD JEDEC rated HBM class 3B(>8KV).
- Pb-free lead plating and halogen-free package

Symbol

Outline

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V _{CB0}	60	V
Collector-Emitter Voltage	V _{CEO}	40	V
Emitter-Base Voltage	V _{EB0}	6	V
Collector Current	I _C	200	mA
Power Dissipation (T _A =25°C)	P _D	225 (Note)	mW
Power Dissipation (T _C =25°C)	P _D	560	mW
Thermal Resistance, Junction to Ambient	R _{θJA}	556 (Note)	°C/W
Thermal Resistance, Junction to Case	R _{θJC}	223	°C/W
Junction Temperature	T _j	150	°C
Storage Temperature	T _{stg}	-55~+150	°C

Note : Free air condition



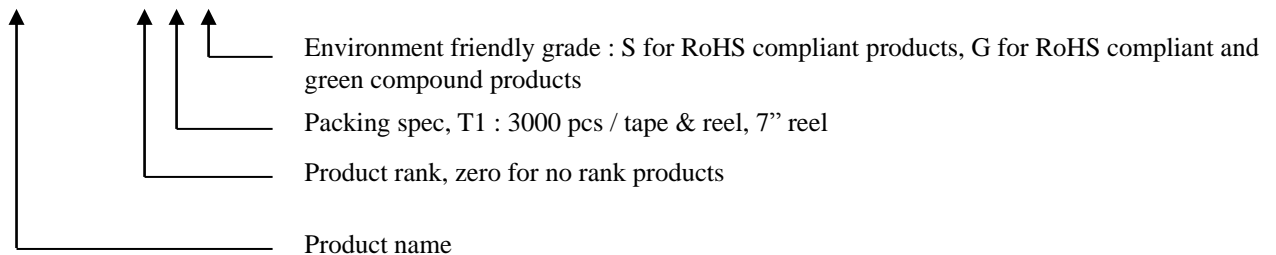
Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	60	-	-	V	$I_C=10\mu A$
BV_{CEO}	40	-	-	V	$I_C=1mA$
BV_{EBO}	6	-	-	V	$I_E=10\mu A$
I_{CEX}	-	-	50	nA	$V_{CE}=30V, V_{BE}=-3V$
$*V_{CE(sat)1}$	-	0.1	0.2	V	$I_C=10mA, I_B=1mA$
$*V_{CE(sat)2}$	-	0.15	0.3	V	$I_C=50mA, I_B=5mA$
$*V_{BE(sat)1}$	0.65	0.75	0.85	V	$I_C=10mA, I_B=1mA$
$*V_{BE(sat)2}$	-	0.85	0.95	V	$I_C=50mA, I_B=5mA$
$*h_{FE1}$	40	-	-		$V_{CE}=1V, I_C=100\mu A$
$*h_{FE2}$	70	-	-		$V_{CE}=1V, I_C=1mA$
$*h_{FE3}$	100	-	300		$V_{CE}=1V, I_C=10mA$
$*h_{FE4}$	60	-	-		$V_{CE}=1V, I_C=50mA$
$*h_{FE5}$	30	-	-		$V_{CE}=1V, I_C=100mA$
f_T	300	-	-	MHz	$V_{CE}=20V, I_C=10mA, f=100MHz$
Cob	-	-	4	pF	$V_{CB}=5V, I_E=0A, f=1MHz$

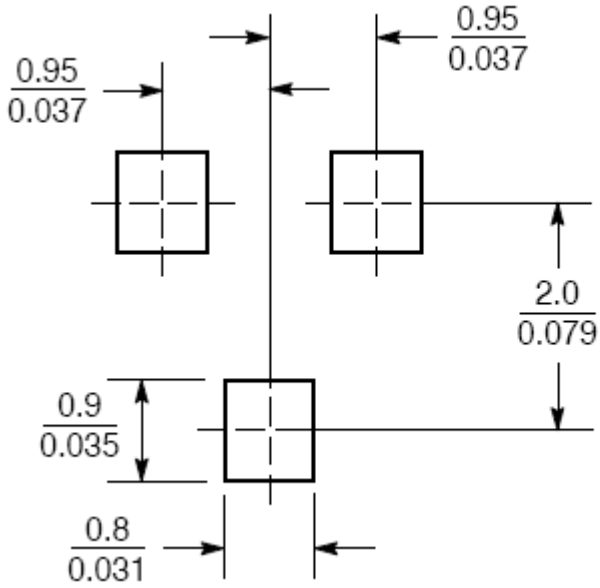
*Pulse Test: Pulse Width $\leq 380\mu s$, Duty Cycle $\leq 2\%$

Ordering Information

Device	Package	Shipping
BTN3904N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



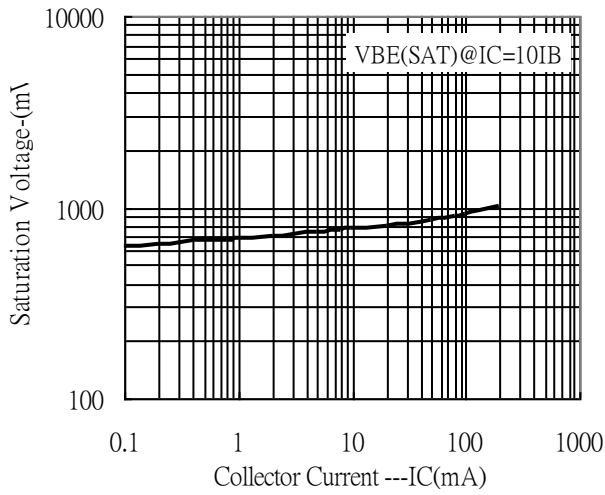
Recommended Soldering Footprint



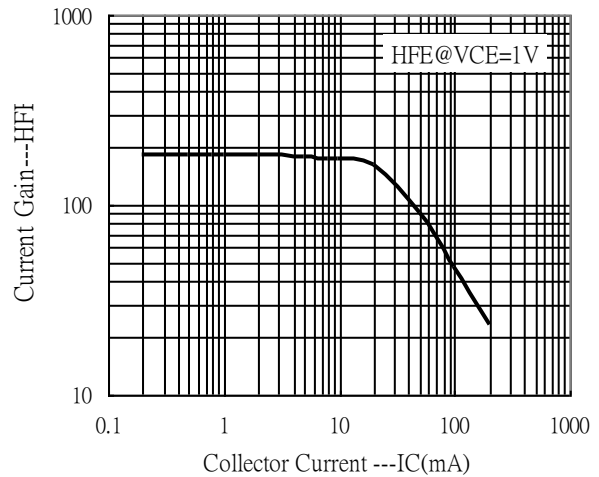
Unit : $\frac{\text{mm}}{\text{inches}}$

Characteristic Curves

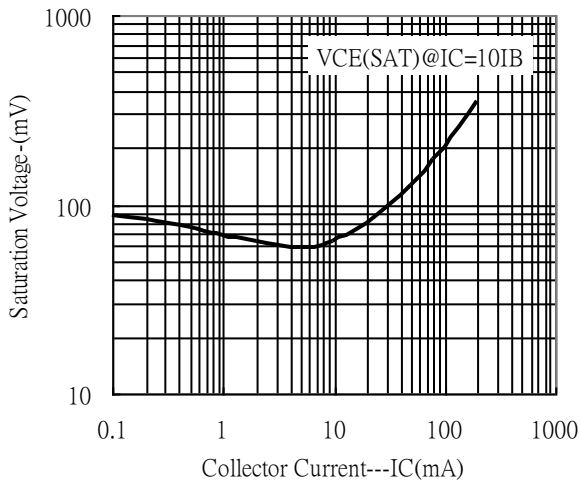
Saturation Voltage vs Collector Current



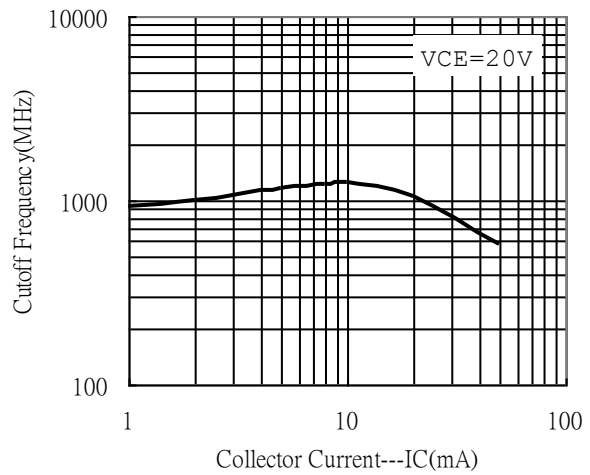
Current Gain vs Collector Current



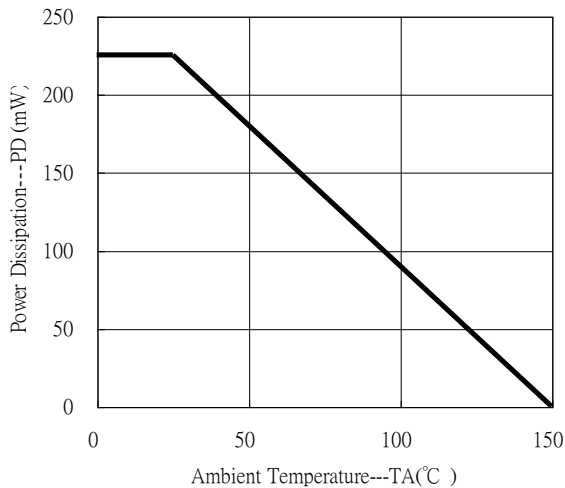
Saturation Voltage vs Collector Current



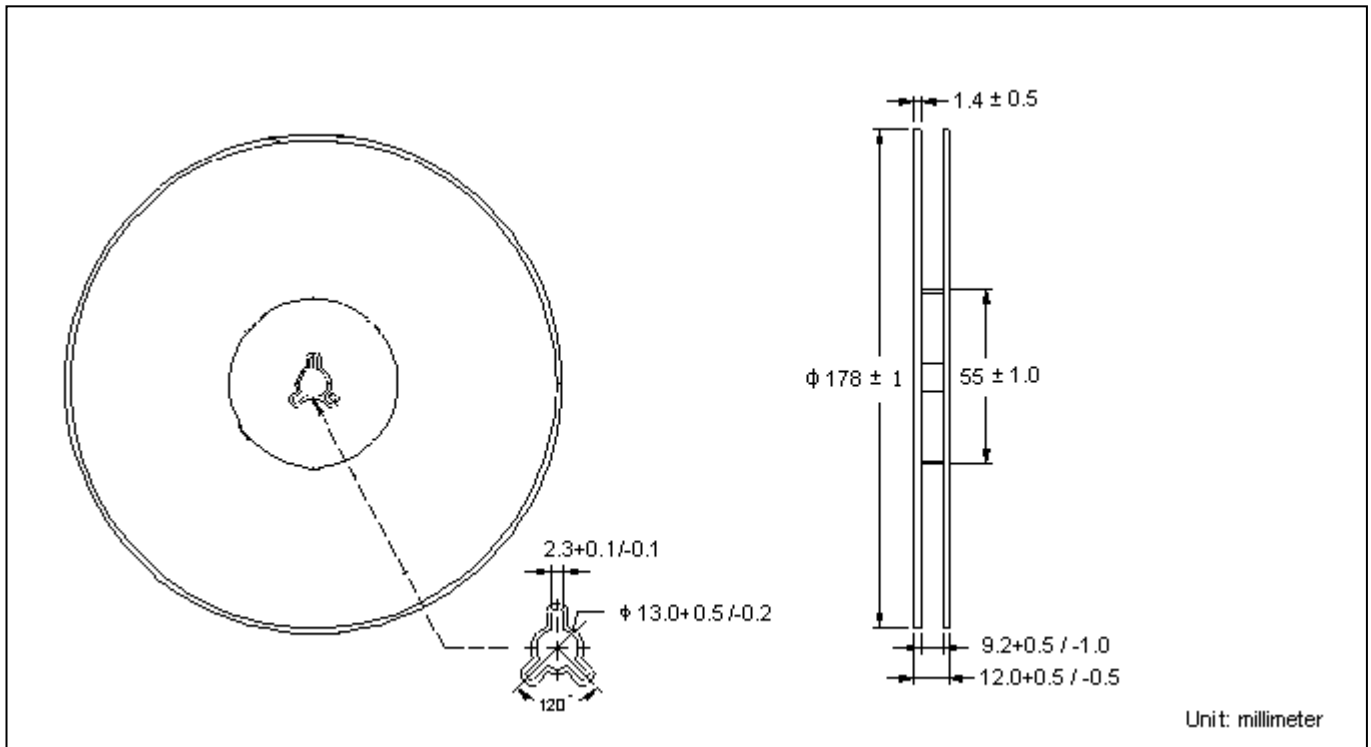
Cutoff Frequency vs Collector Current



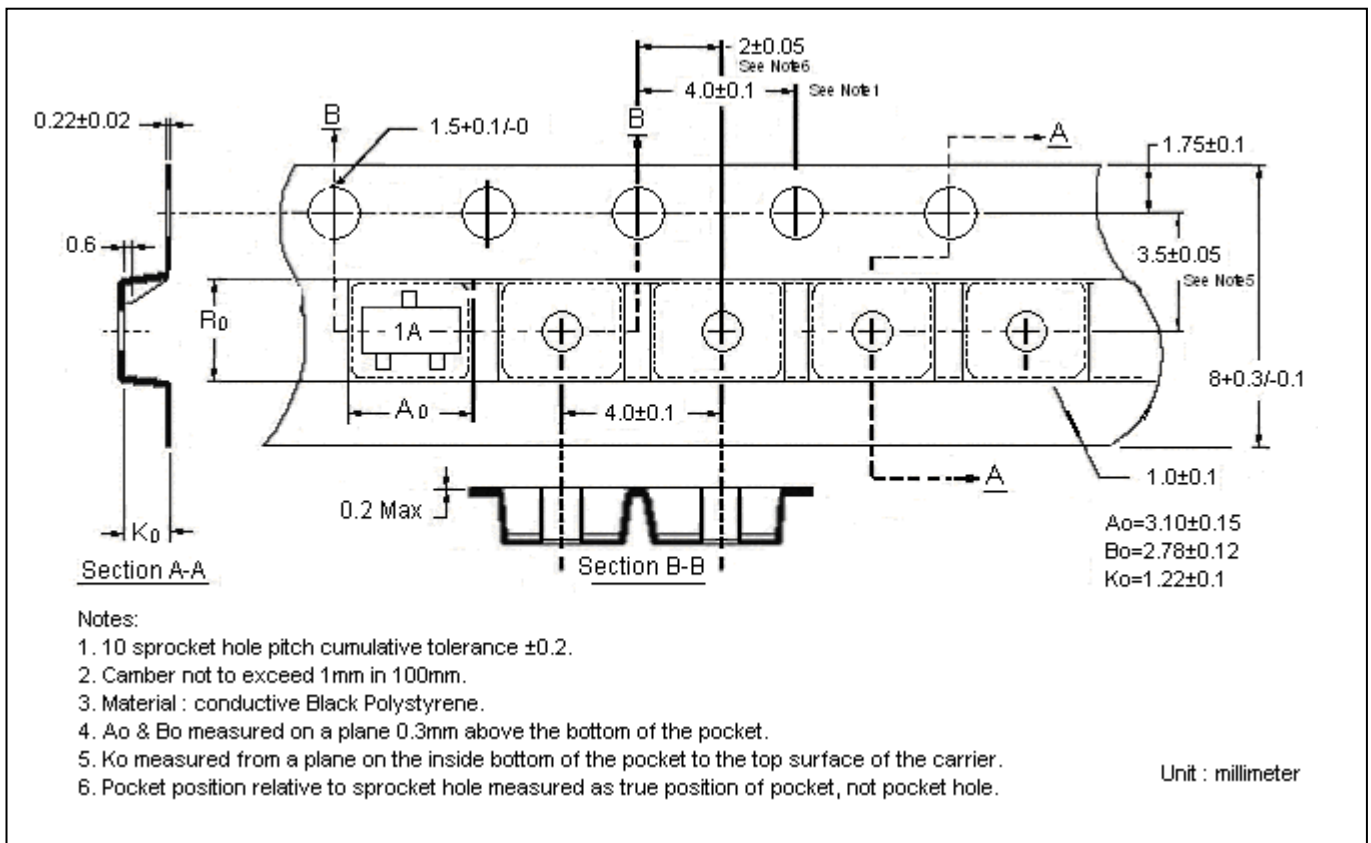
Power Derating Curve



Reel Dimension



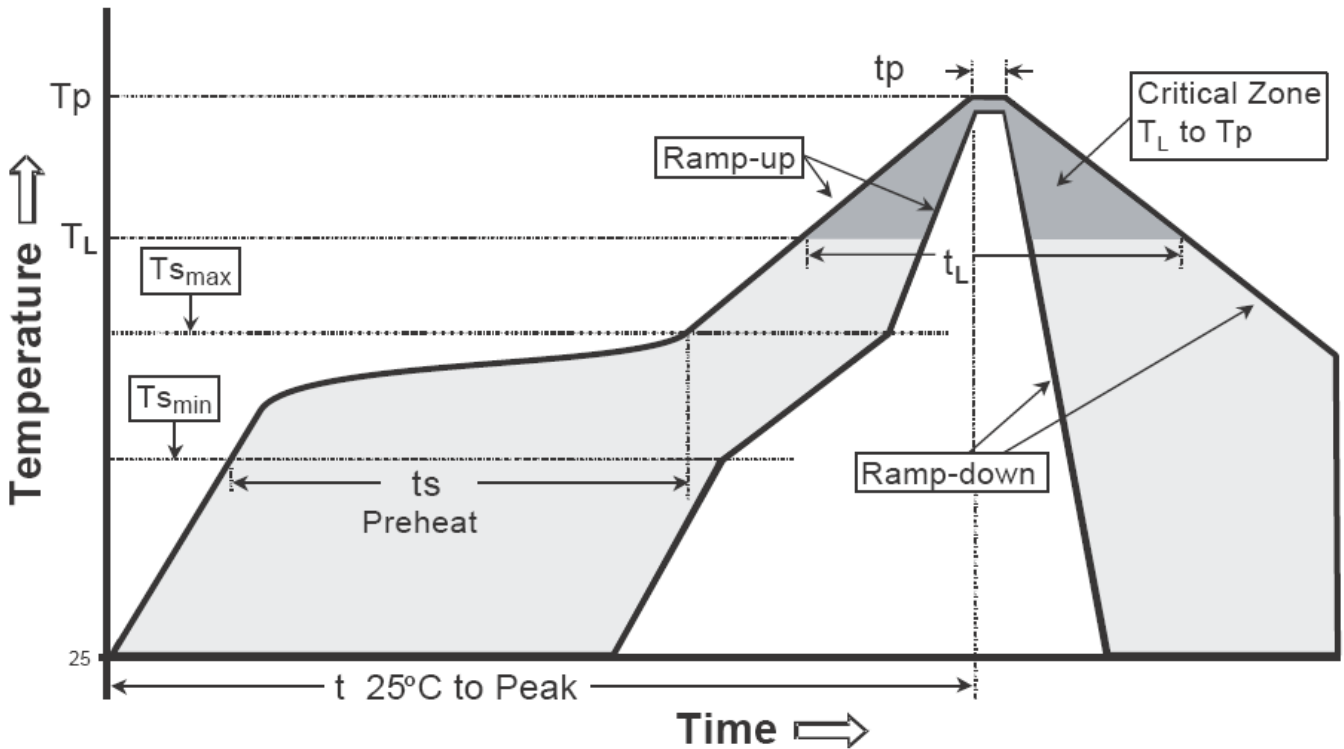
Carrier Tape Dimension



Recommended wave soldering condition

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

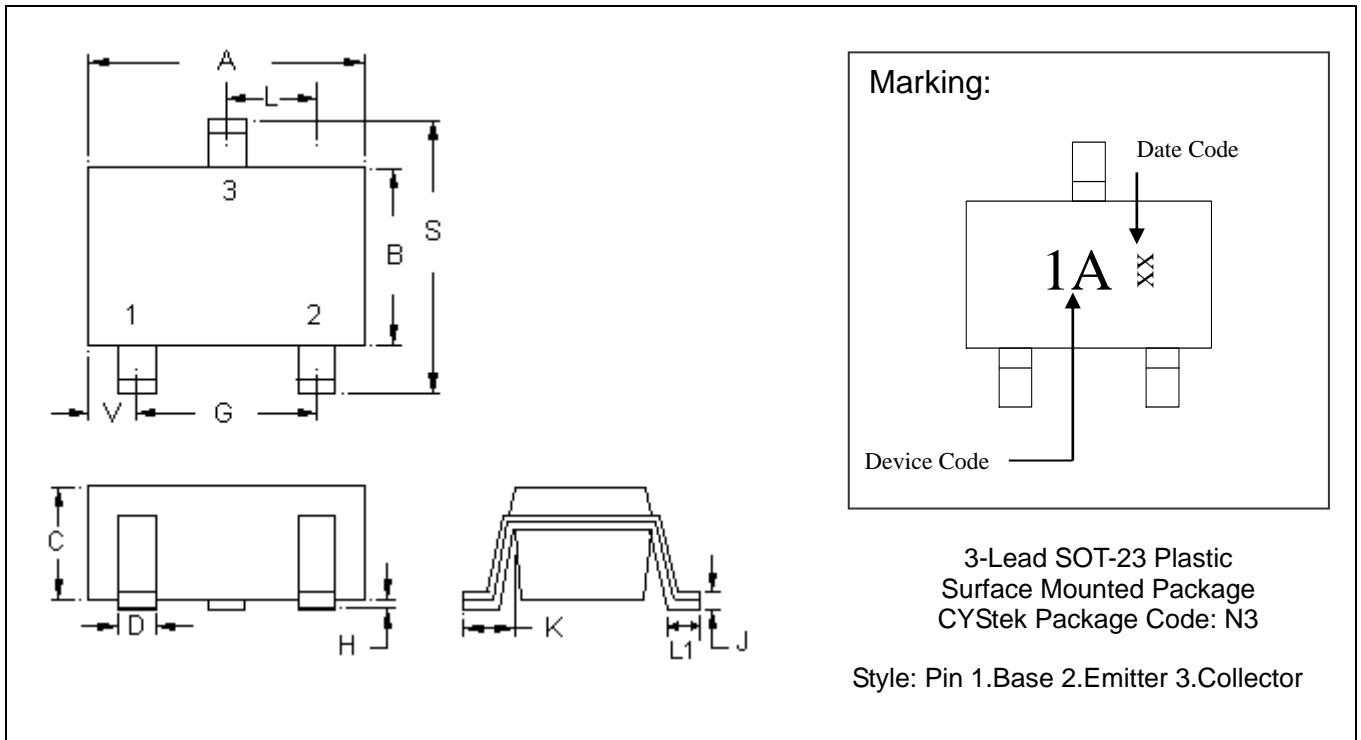
Recommended temperature profile for IR reflow



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 (TL)	183°C	217°C
- Time (tL)	60-150 seconds	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-23 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

- 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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