General Purpose NPN Epitaxial Planar Transistor

BTC3906N3

Description

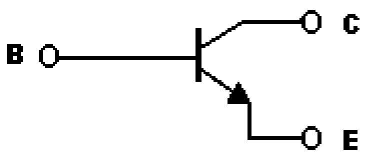
The BTC3906N3 is designed for general purpose applications requiring high breakdown voltage.

Features

- High collector-emitter breakdown voltage. (BV_{CEO}=160V @ I_C=1mA)
- Complement to BTA1514N3
- Pb-free and Halogen-free package

Symbol

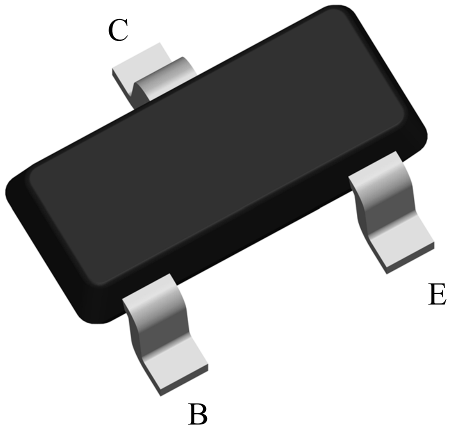
BTC3906N3



B : Base
C : Collector
E : Emitter

Outline

SOT-23



Ordering Information

Device	Package	Shipping
BTC3906N3-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	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 (T_A=25°C)	P_D	225 (Note)	mW
Power Dissipation (T_C=25°C)	P_D	560	mW
Thermal Resistance, Junction to Ambient (Note)	$R_{\theta JA}$	556 (Note)	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	223	°C/W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Note : Free air condition.

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
*$h_{FE}1$	100	-	-	-	V_{CE}=5V, I_C=1mA
*$h_{FE}2$	100	-	-	-	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

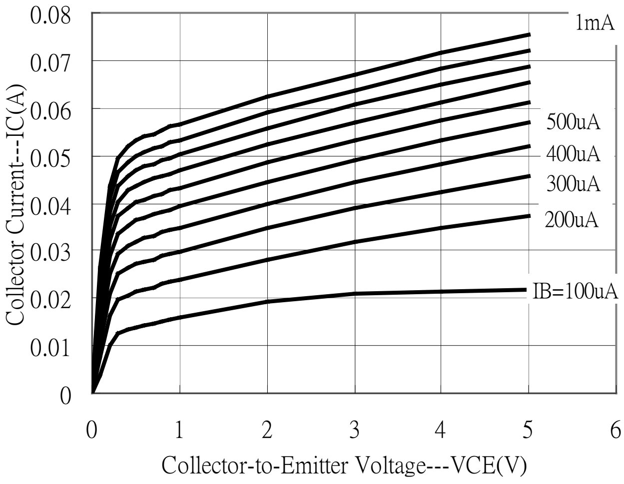
*Pulse Test: Pulse Width ≤380us, Duty Cycle≤2%

Classification Of h_{FE} 4

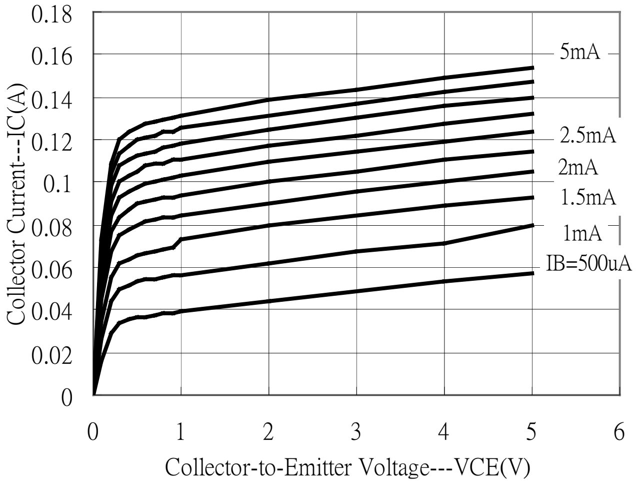
Rank	Q	R
Range	120~270	180~390

Typical Characteristics

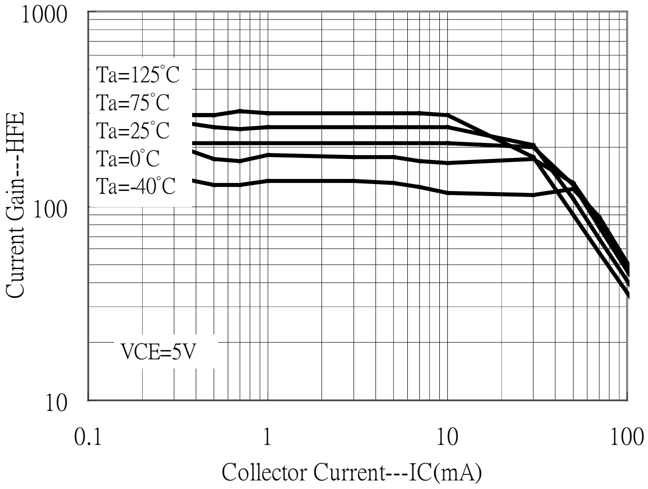
Emitter Grounded Output Characteristics



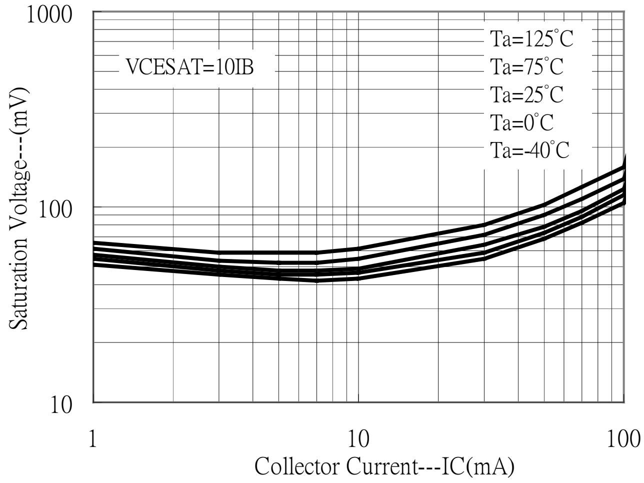
Emitter Grounded Output Characteristics



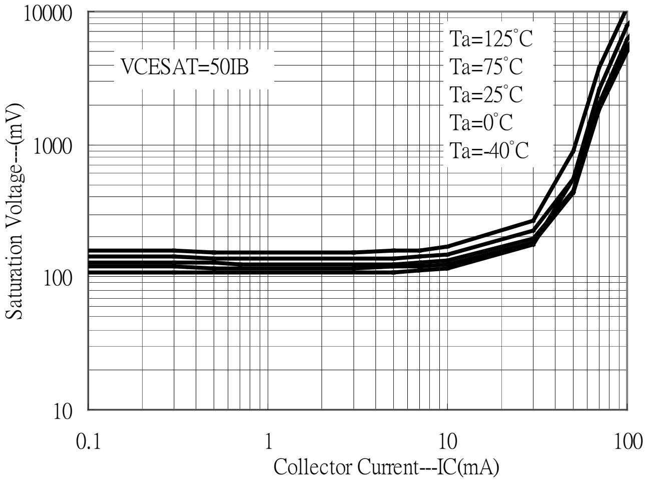
Current Gain vs Collector Current



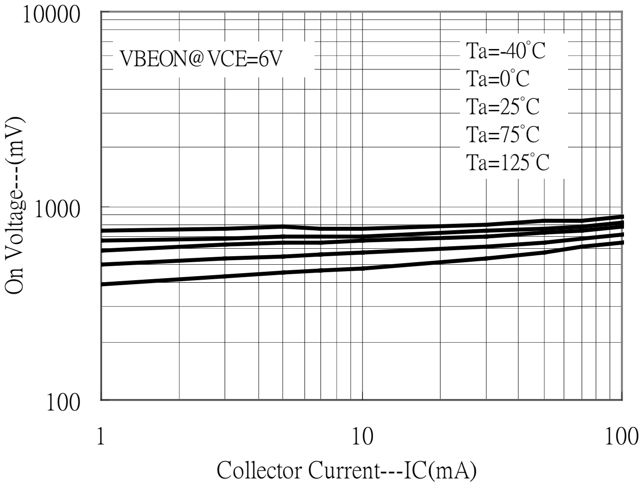
Saturation Voltage vs Collector Current



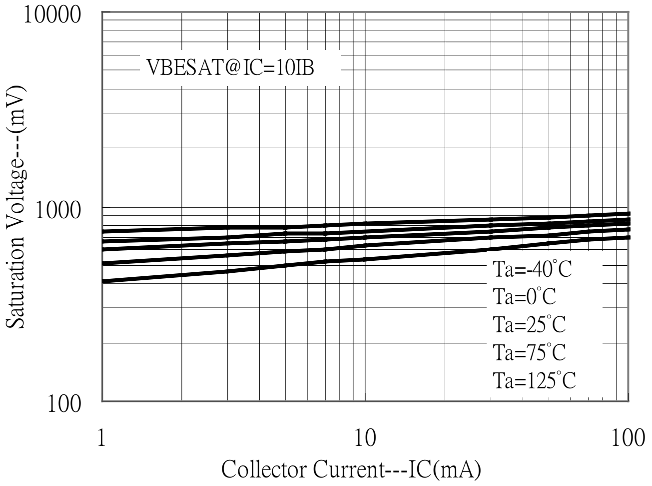
Saturation Voltage vs Collector Current

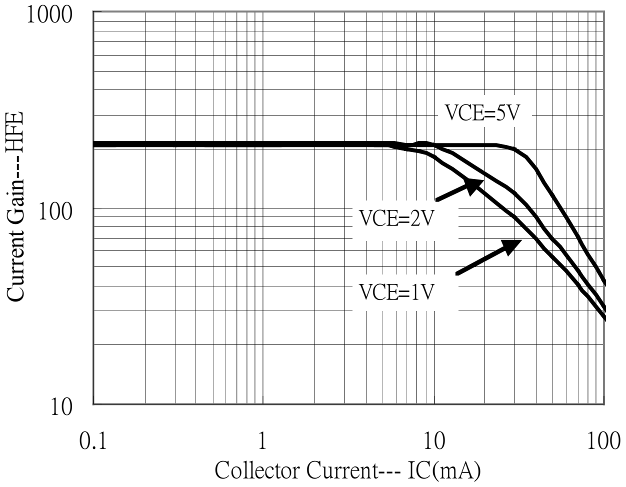


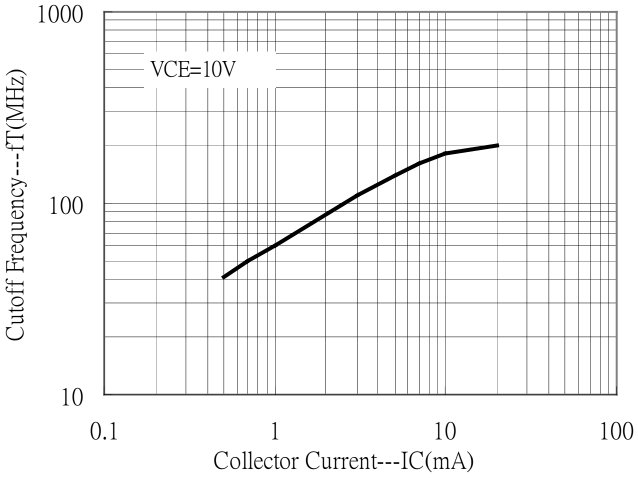
On Voltage vs Collector Current

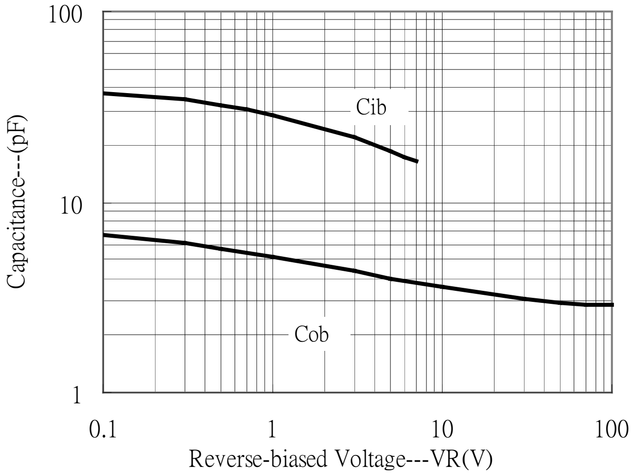


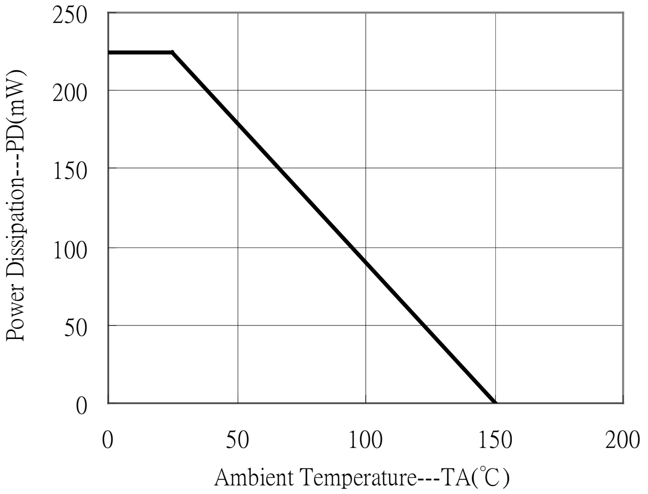
Typical Characteristics(Cont.)

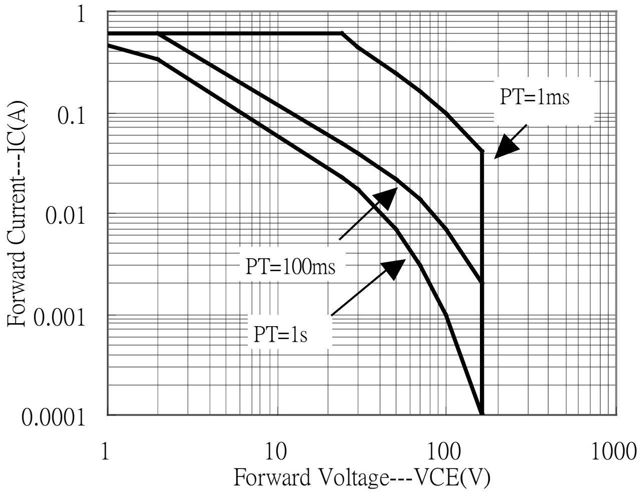

Saturation Voltage vs Collector Current


Current Gain vs Collector Current

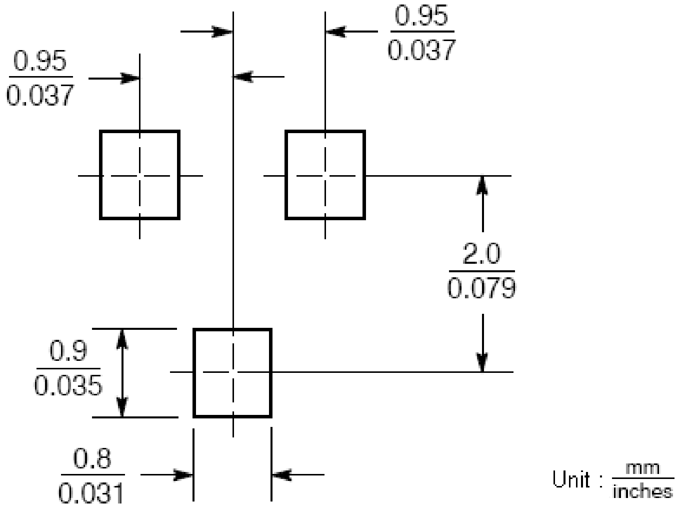

Cutoff Frequency vs Collector Current


Capacitance vs Reverse-biased Voltage

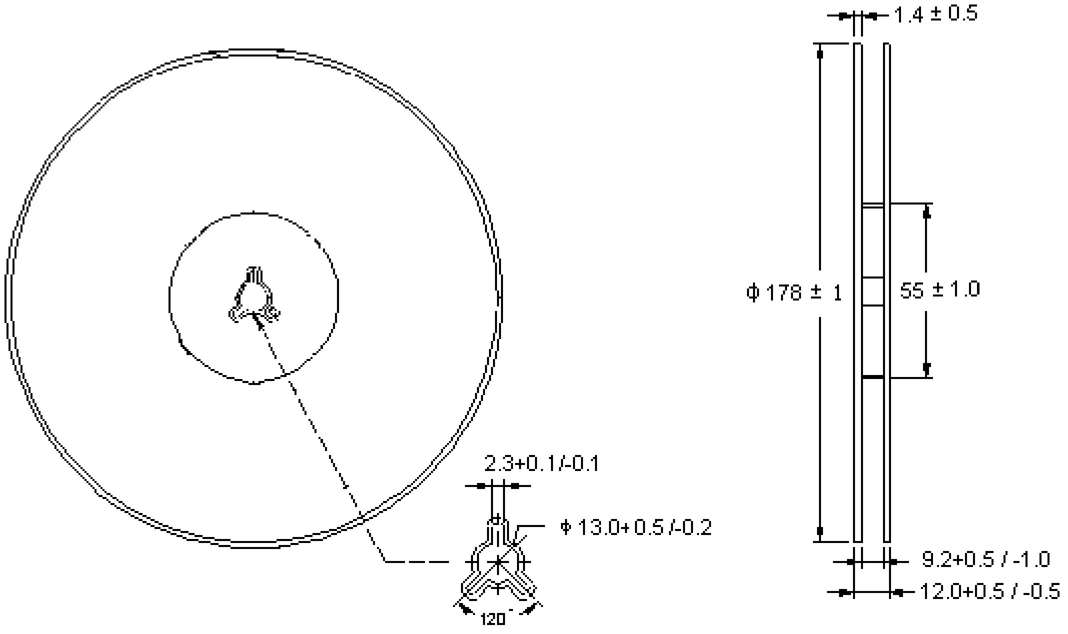

Power Derating Curve


Safe Operating Area

Recommended Soldering Footprint

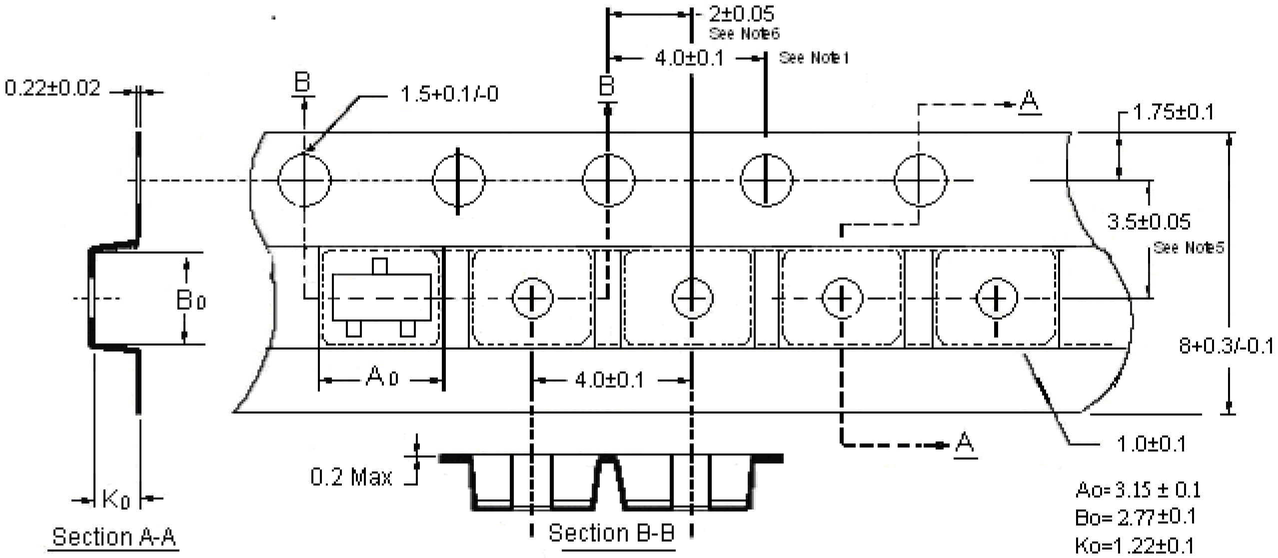


Reel Dimension



Unit: millimeter

Carrier Tape Dimension



Ao=3.15 ± 0.1
Bo=2.77±0.1
Ko=1.22±0.1

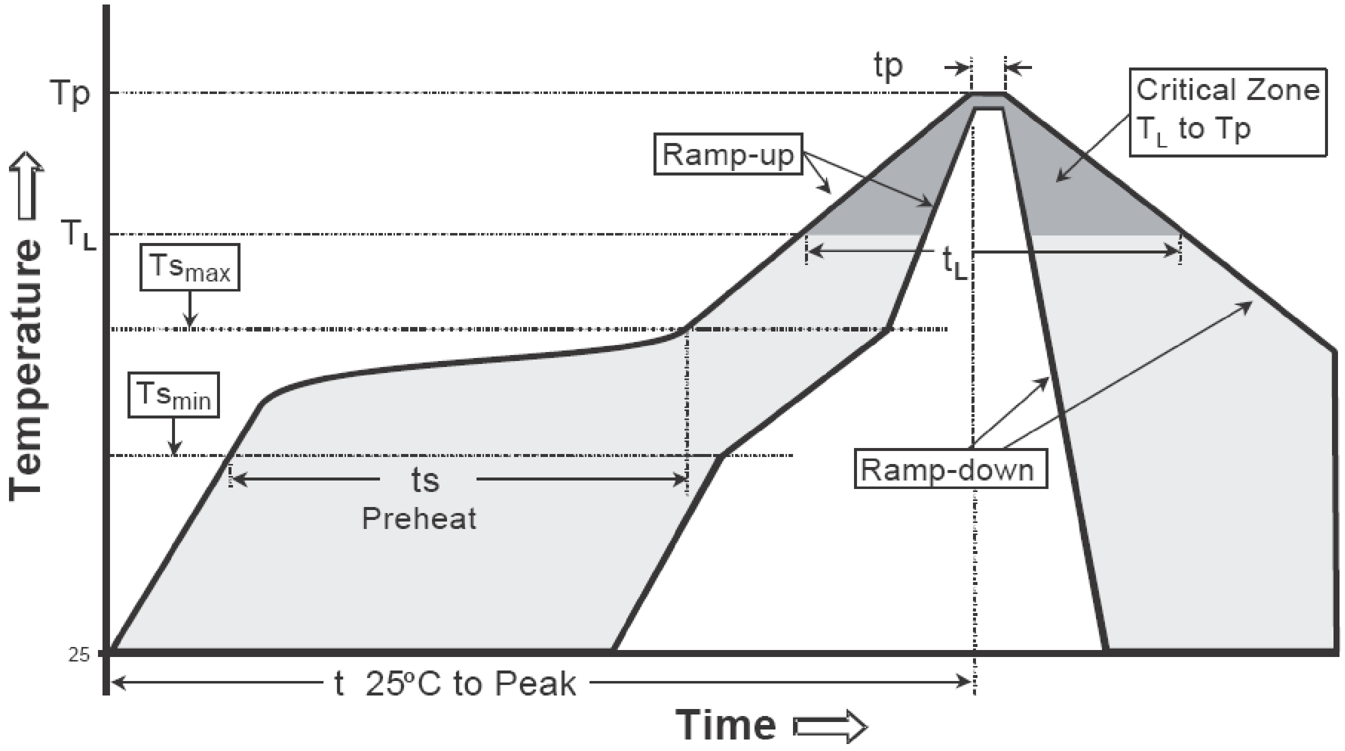
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

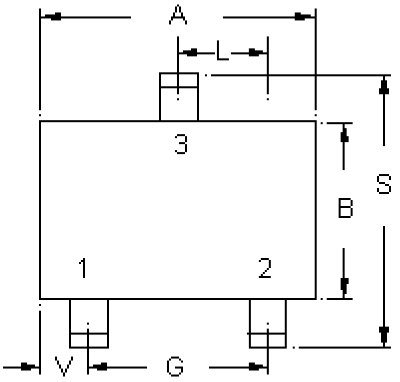
Recommended temperature profile for IR reflow



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(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.

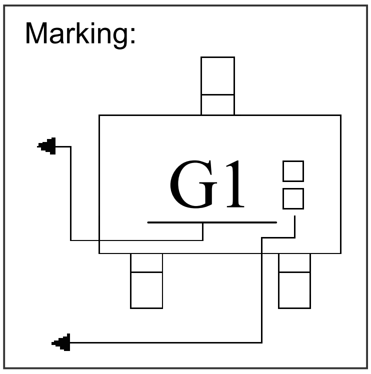
Note : All temperatures refer to topside of the package, measured on the package body surface.

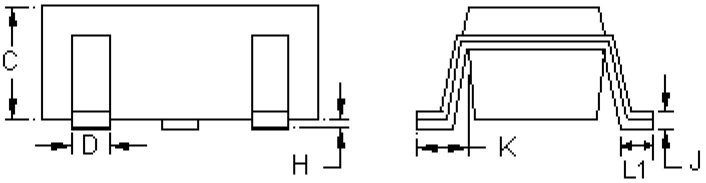
SOT-23 Dimension



Product Code

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

*: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	0.0551	1.20	1.40	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	0.1004	2.10	2.55
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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