NPN High Voltage Planar Transistor

BTNA45N3

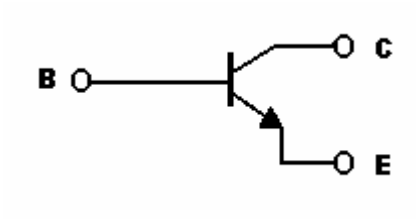
BV_{CEO}	500V
I_C	150mA
V_{CESAT}	150mV (max)

Features

- High breakdown voltage. (BV_{CEO}=500V)
- Low collector-emitter saturation voltage V_{CESAT}.
- High collector current capability I_C and I_{CM}.
- High collector current gain H_{FE} at high collector current I_C.
- Low collector output capacitance. (Typ. 5pF at V_{CB} =20V)
- Pb-free lead plating and halogen-free package.

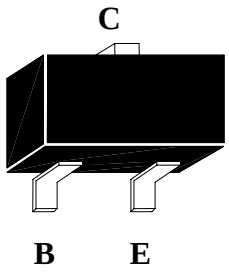
Symbol

BTNA45N3



Outline

SOT-23



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	500	V
Collector-Emitter Voltage	V_{CES}	500	
Collector-Emitter Voltage	V_{CEO}	500	
Emitter-Base Voltage	V_{EBO}	7	
Collector Current	I_C	150	mA
Peak Collector Current , single pulse, pulse width tp<1ms	I_{CM}	500	
Peak Base Current, single pulse, pulse width tp<1ms	I_{BM}	200	
Power Dissipation (Note)	Pd	300	mW
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55~+150	°C

Note : Device mounted on a FR-4 PCB, single sided copper, tin plated and standard footprint.

Thermal Characteristics

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, in free air (Note)	Rth,j-a	417	°C/W
Thermal Resistance, Junction-to-Solder point	Rth,j-sp	70	

Note : Device mounted on a FR-4 PCB, single sided copper, tin plated and standard footprint.

Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
*BV_{CBO}	500	-	-	V	I_C=50μA
*BV_{CES}	500	-	-		I_C=50μA
*BV_{CEO}	500	-	-		I_C=10mA
BV_{EBO}	7	-	-		I_E=50μA
I_{CBO}	-	-	100	nA	V_{CB}=500V
I_{CES}	-	-	100		V_{CE}=500V
I_{EBO}	-	-	100		V_{EB}=5V
*$V_{CE(sat)}$ 1	-	-	90	mV	I_C=20mA, I_B=2mA
*$V_{CE(sat)}$ 2	-	-	150		I_C=50mA, I_B=6mA
*$V_{BE(sat)}$	-	-	0.9	V	I_C=50mA, I_B=5mA
*$V_{BE(on)}$	-	-	0.9		V_{CE}=10V, I_C=50mA
*h_{FE} 1	120	-	-	-	V_{CE}=10V, I_C=1mA
*h_{FE} 2	120	-	300	-	V_{CE}=10V, I_C=30mA
*h_{FE} 3	120	-	-	-	V_{CE}=10V, I_C=50mA
*h_{FE} 4	30	-	-	-	V_{CE}=10V, I_C=100mA
f_T	50	-	-	MHz	V_{CE}=20V, I_C=10mA, f=100MHz
Cob	-	5	8	pF	V_{CB}=20V, I_E=0A, f=1MHz
ton	-	110	-	ns	V_{CE}=100V, I_C=50mA, I_B1=5mA, I_B 2= -10mA
toff	-	1500	-		

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

Ordering Information

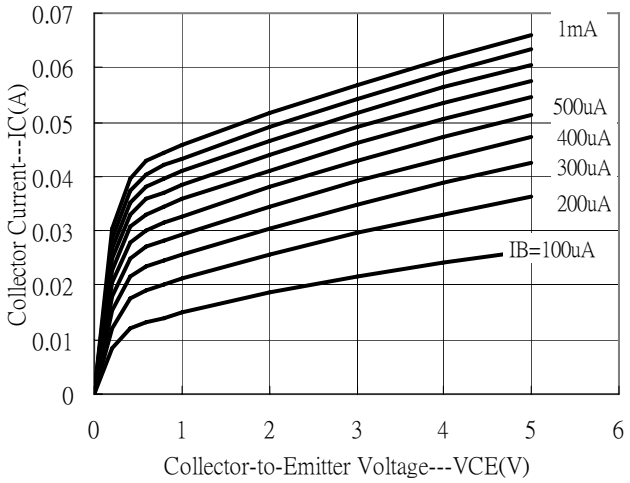
Device	Package	Shipping	Marking
BTNA45N3	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel	LK

Moisture Sensitivity Level : Conform to JEDEC Level 1

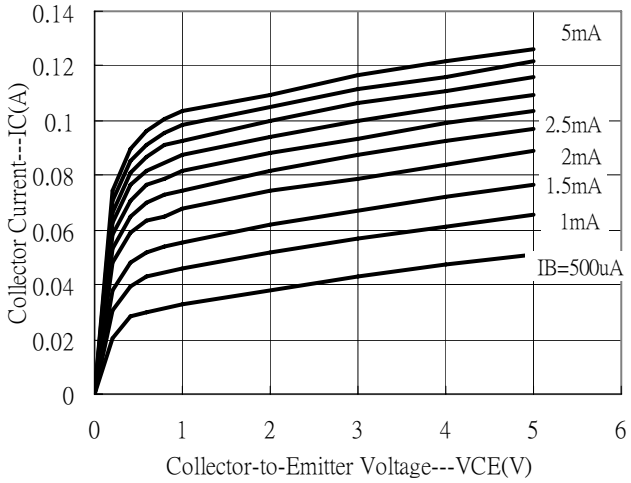
Recommended Storage Condition:
Temperature : ≤ 30 °C
Humidity : ≤ 60% RH

Typical Characteristics

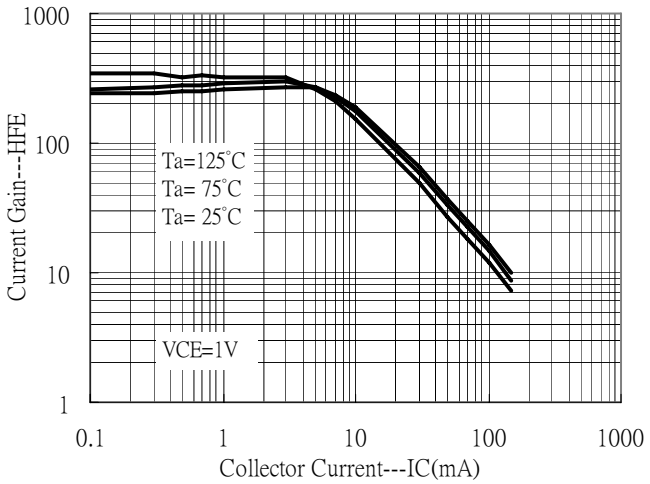
Emitter Grounded Output Characteristics



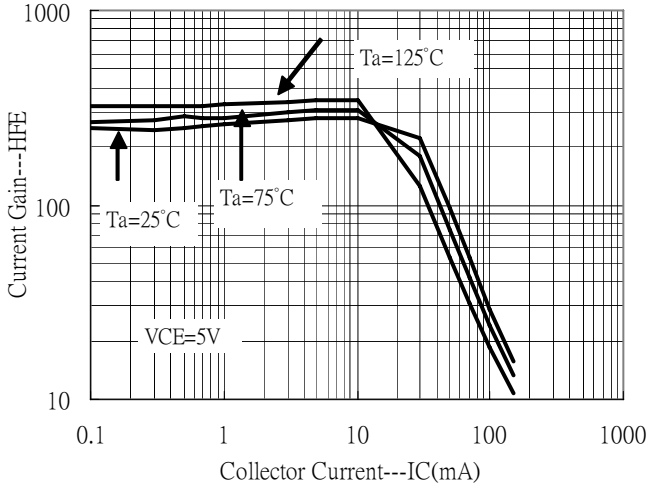
Emitter Grounded Output Characteristics



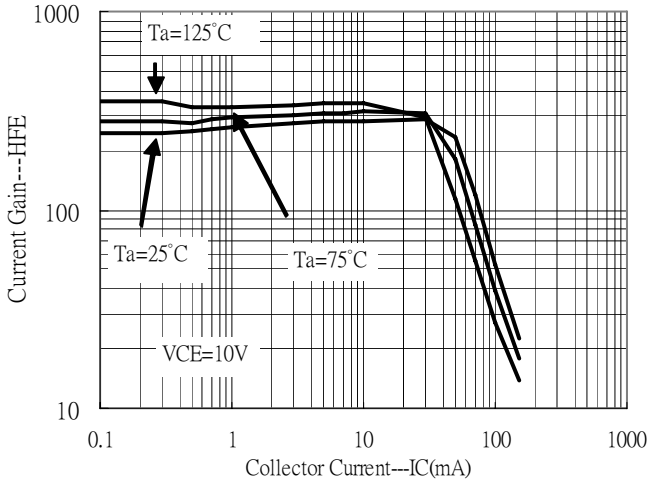
Current Gain vs Collector Current



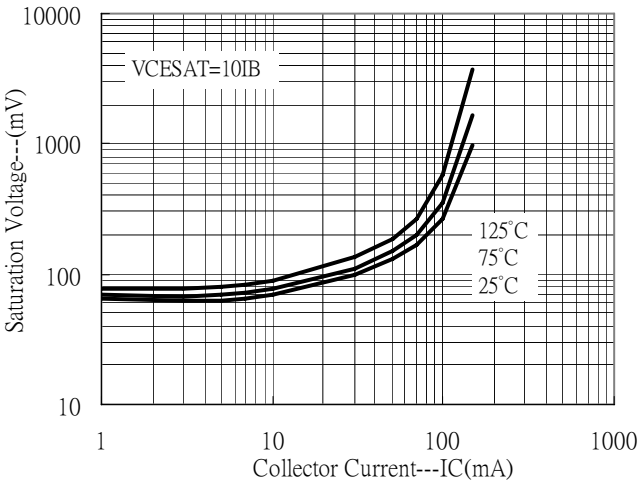
Current Gain vs Collector Current



Current Gain vs Collector Current

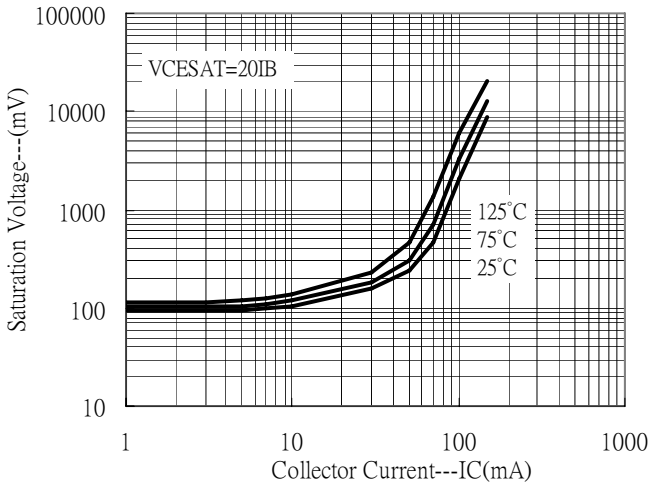


Saturation Voltage vs Collector Current

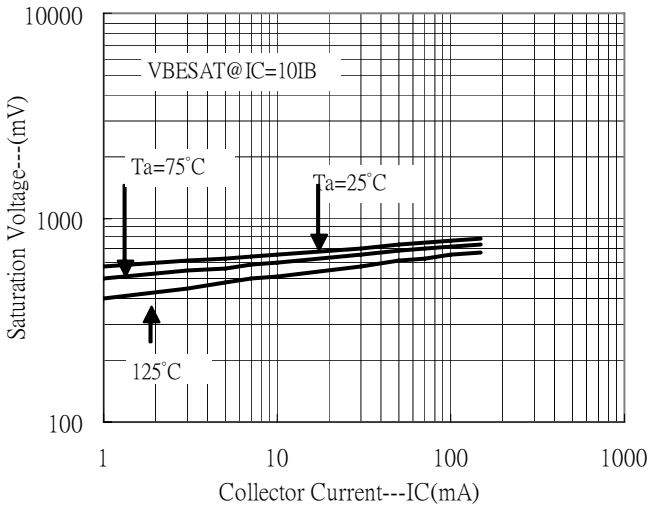


Typical Characteristics(Cont.)

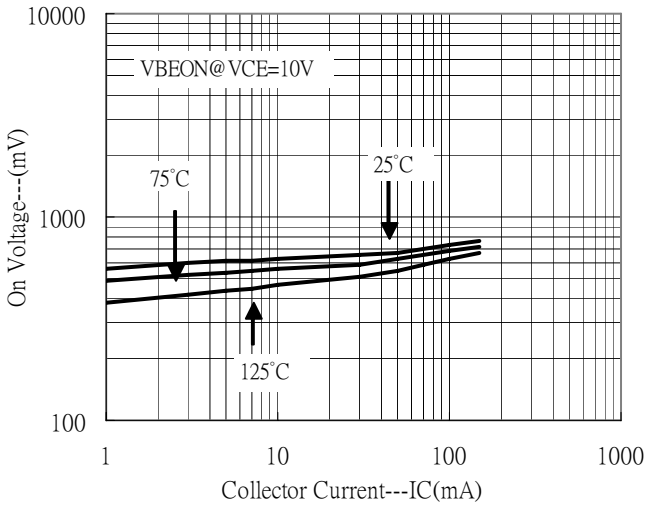
Saturation Voltage vs Collector Current



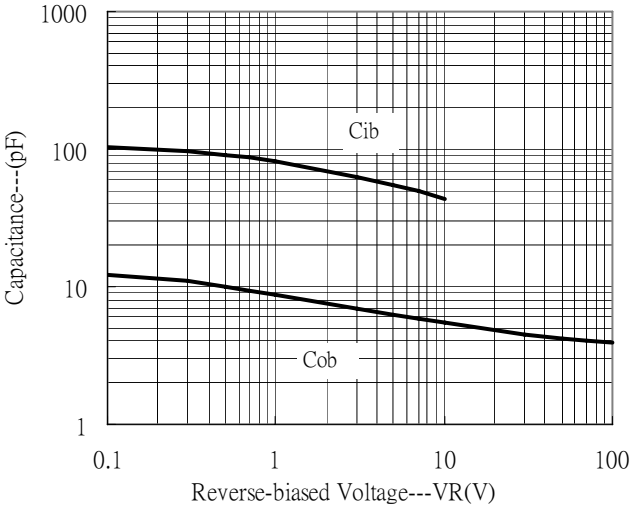
Saturation Voltage vs Collector Current



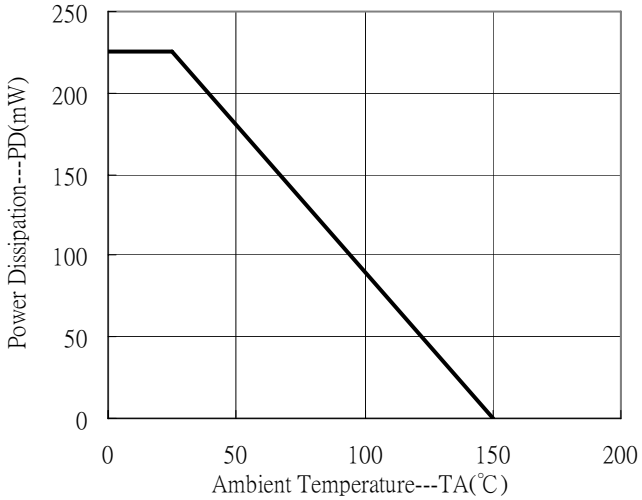
On Voltage vs Collector Current



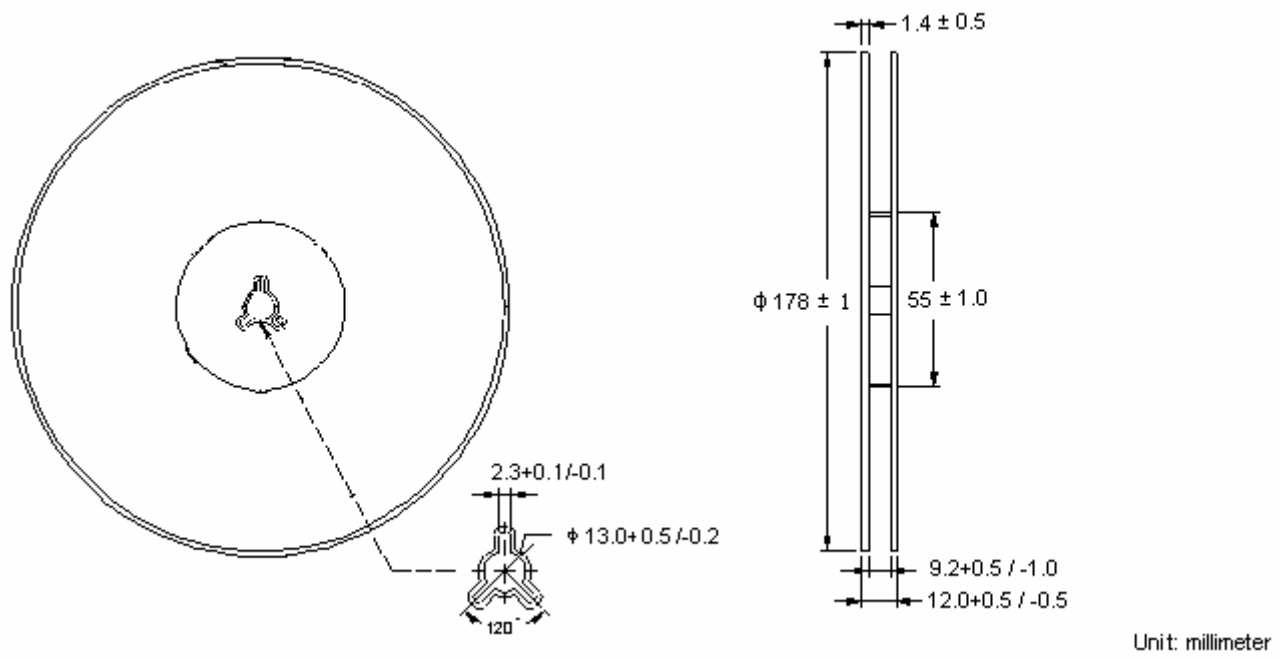
Capacitance vs Reverse-biased Voltage



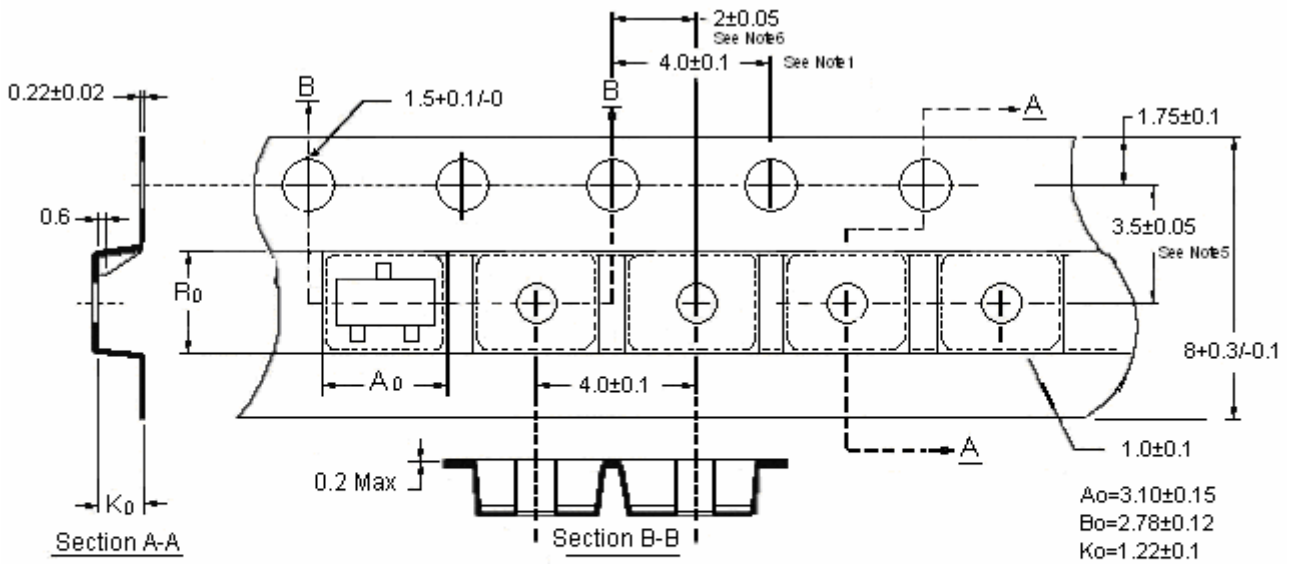
Power Derating Curve



Reel Dimension



Carrier Tape Dimension



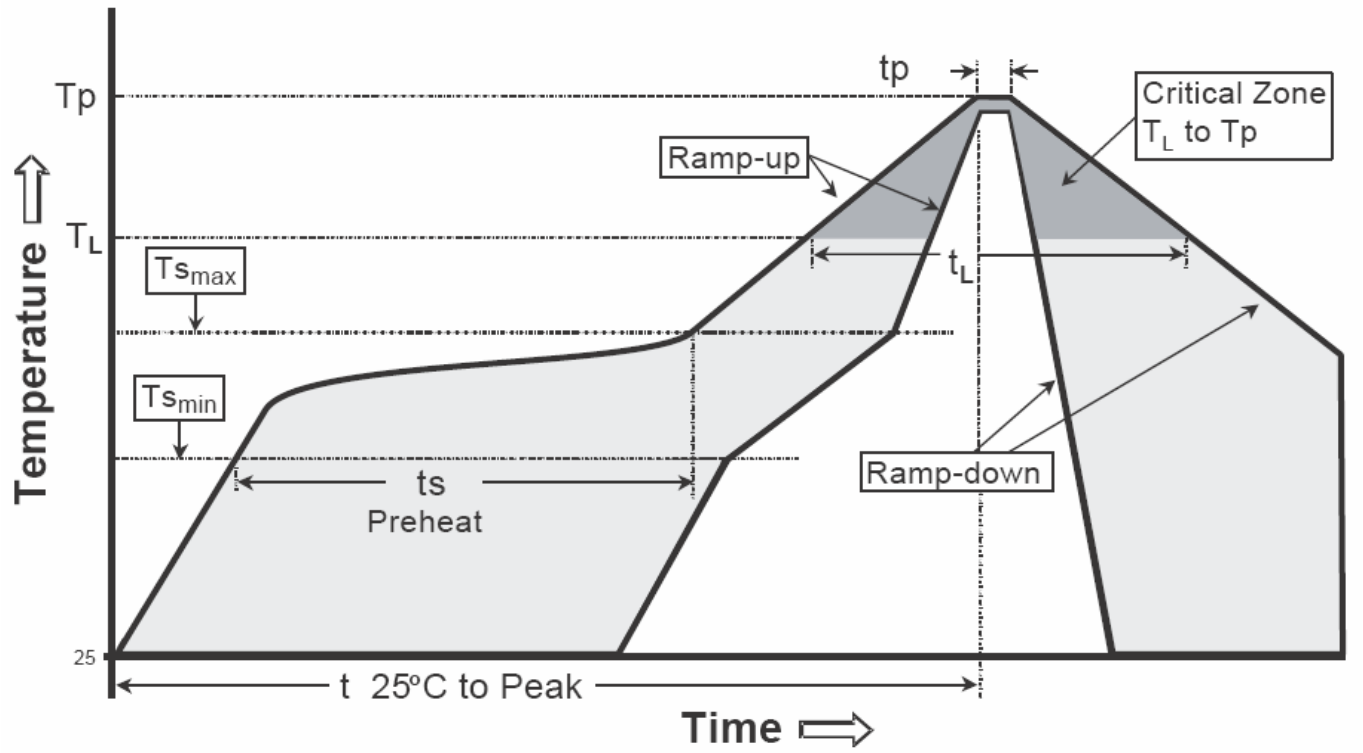
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

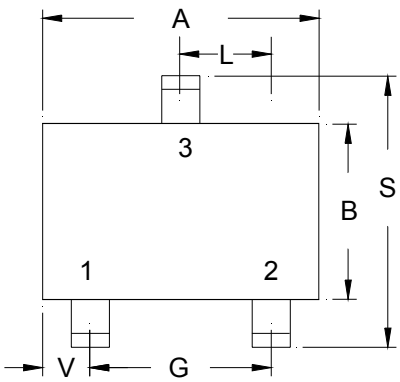
Recommended temperature profile for IR reflow

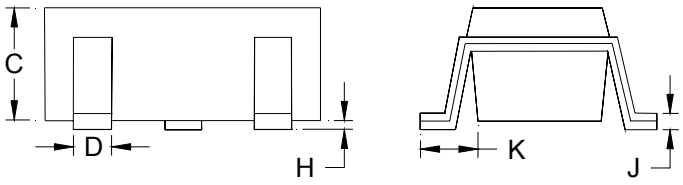


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L)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

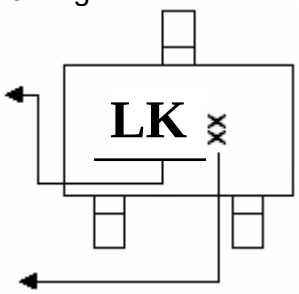




Product Code

Date Code: Year+Month
Year: 9→2009, 0→2010
Month: 1→1, 2→2, • • •
9→9, A→10, B→11, C→12

Marking:



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	0.0034	0.0070	0.085	0.177
B	0.0472	0.0630	1.20	1.60	K	0.0128	0.0266	0.32	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	0.1083	2.10	2.75
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0005	0.0040	0.013	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.