NPN Transistor with Zener diode

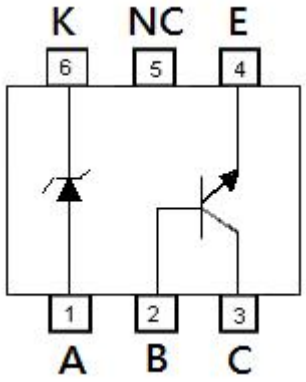
HBNZ6056N6

Features

- Includes a NPN chip and a Zener diode chip in a SOT-23-6L package.
- Mounting possible with SOT-23 automatic mounting machines.
- Pb-free lead plating package.

Equivalent Circuit

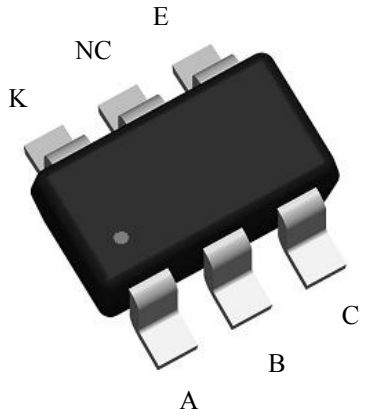
HBNZ6056N6



B : Base E : Emitter C : Collector
A : Anode K : Cathode NC : Not Connected

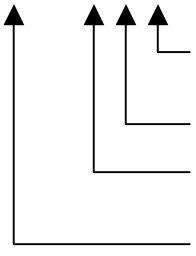
Outline

SOT-23-6L



Ordering Information

Device	Package	Shipping
HBNZ6056N6-0-T1-G	SOT-23-6L (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), NPN Transistor

Parameter	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current(DC)	I_C	600	mA
Peak Collector Current	I_{CP}	1.2	A
Peak Base Current	I_{BP}	100	mA

Absolute Maximum Ratings (Ta=25°C), Zener Diode

Parameter	Symbol	Value	Unit
Forward Voltage @ I_F=10mA	V_F	0.9	V

Thermal Characteristics

Characteristics	Symbol	Value	Unit
Power Dissipation	P_D	300 (Note)	mW
Thermal Resistance, Junction to Ambient, max	$R_{\theta JA}$	417 (Note)	°C/W
Operating Junction and Storage Temperature	Tj, Tstg	-55~+150	°C

Note : .Surface mounted on minimum copper pad.

NPN Transistor Electrical Characteristics (Tj=25°C, unless otherwise specified)

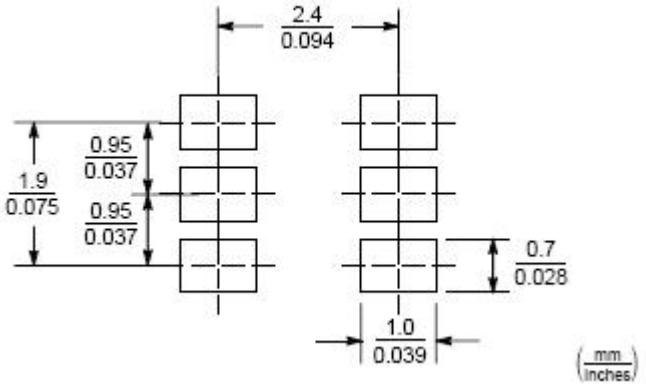
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	75	-	-	V	I_C=10μA
BV_{CEO}	50	-	-	V	I_C=10mA
BV_{EBO}	6	-	-	V	I_E=10μA
I_{CBO}	-	-	100	nA	V_{CB}=60V
I_{CEX}	-	-	100	nA	V_{CE}=60V, V_{EB}=0.3V
I_{EBO}	-	-	100	nA	V_{EB}=6V
*$V_{CE(sat)}$	-	-	0.3	V	I_C=150mA, I_B=15mA
*$V_{CE(sat)}$	-	-	0.5	V	I_C=500mA, I_B=50mA
*$V_{BE(sat)}$	-	-	0.95	V	I_C=150mA, I_B=15mA
*$V_{BE(sat)}$	-	-	1.2	V	I_C=500mA, I_B=50mA
h_{FE}	50	-	-	-	V_{CE}=1V, I_C=100μA
h_{FE}	80	-	-	-	V_{CE}=1V, I_C=1mA
h_{FE}	80	-	-	-	V_{CE}=1V, I_C=10mA
*h_{FE}	100	-	300	-	V_{CE}=1V, I_C=150mA
*h_{FE}	40	-	-	-	V_{CE}=2V, I_C=500mA
f_T	300	-	-	MHz	V_{CE}=20V, I_C=20mA, f=100MHz
Cob	-	-	8	pF	V_{CB}=10V, f=1MHz

Zener Diode Electrical Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
V_Z	5.49	-	5.73	V	I_{ZT}=5mA
V_F	-	-	0.9	V	I_F=10mA
Z_{ZK}	-	-	900	Ω	I_Z=0.5mA
Z_{ZT}	-	-	30	Ω	I_Z=5mA
I_R	-	-	1	μA	V_R=2V
C	-	-	250	pF	V_R=0V, f=1MHz

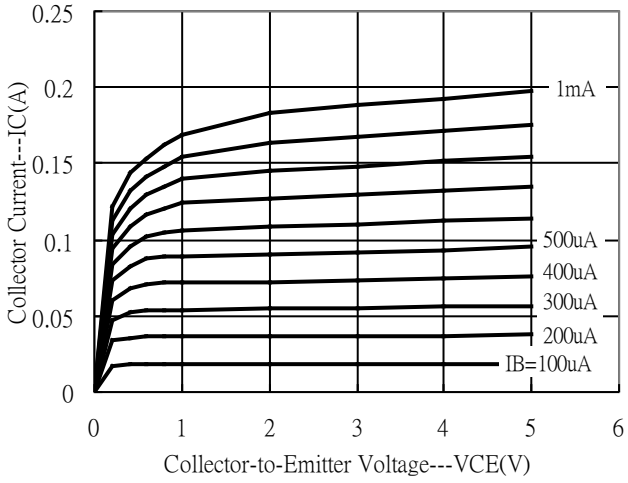
*Pulse Test: Pulse Width ≤380μs, Duty Cycle≤2%

Recommended Soldering Footprint

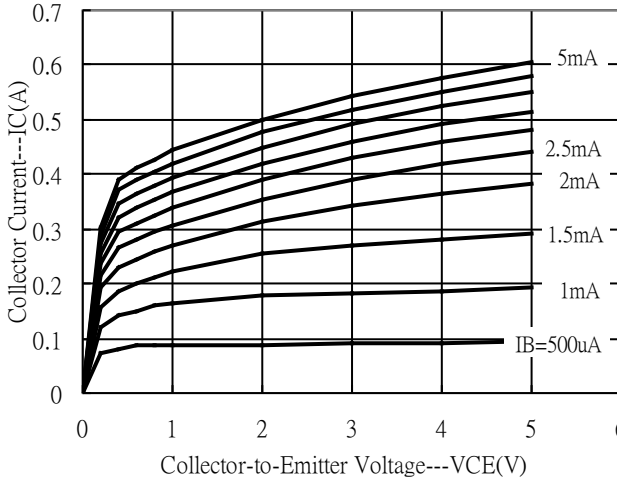


NPN Transistor Typical Characteristics

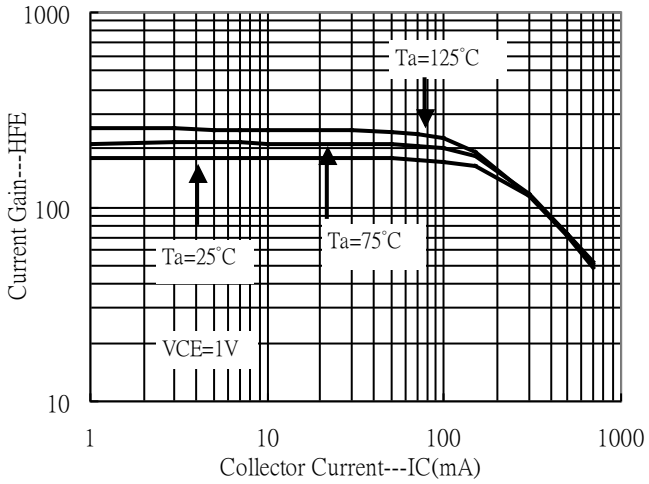
Emitter Grounded Output Characteristics



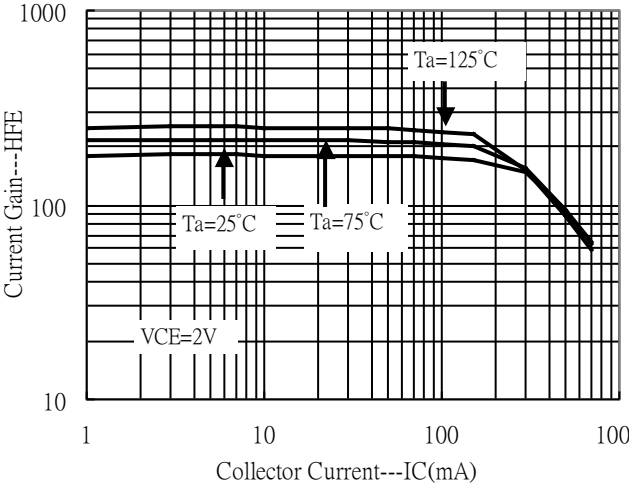
Emitter Grounded Output Characteristics



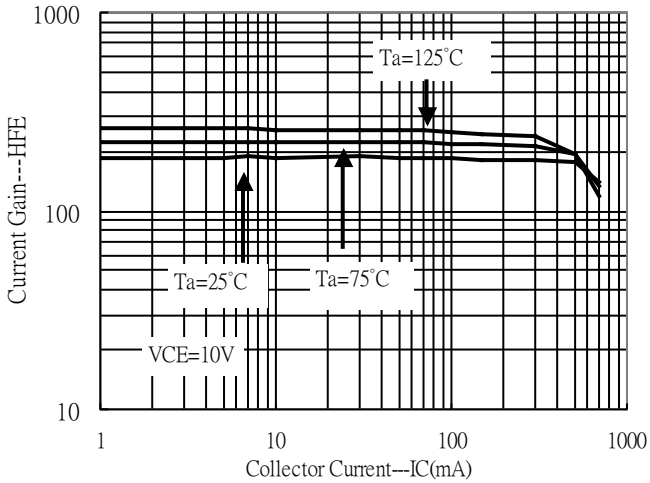
Current Gain vs Collector Current



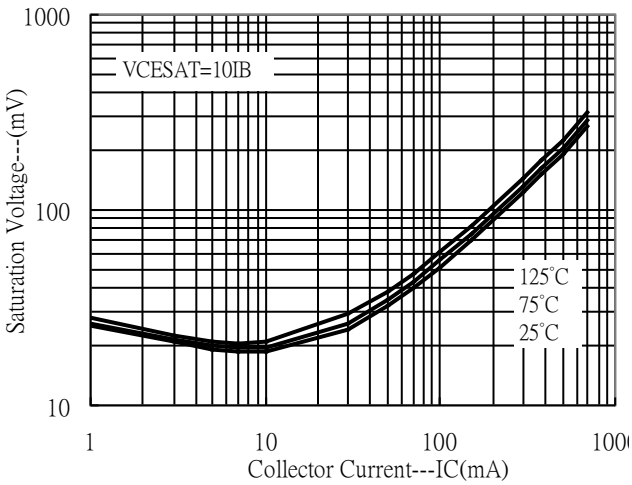
Current Gain vs Collector Current



Current Gain vs Collector Current

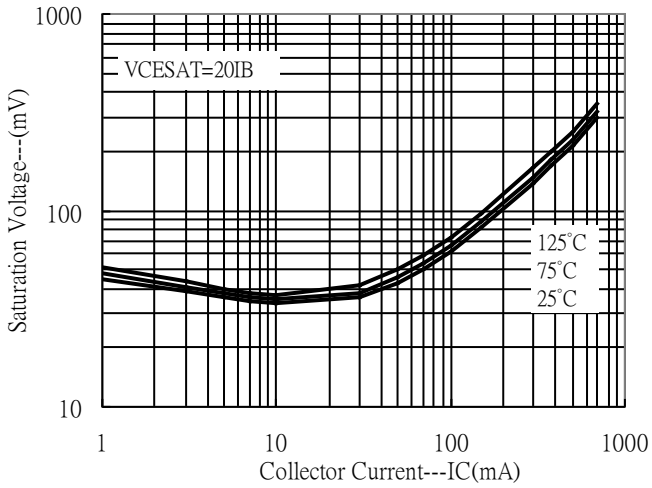


Saturation Voltage vs Collector Current

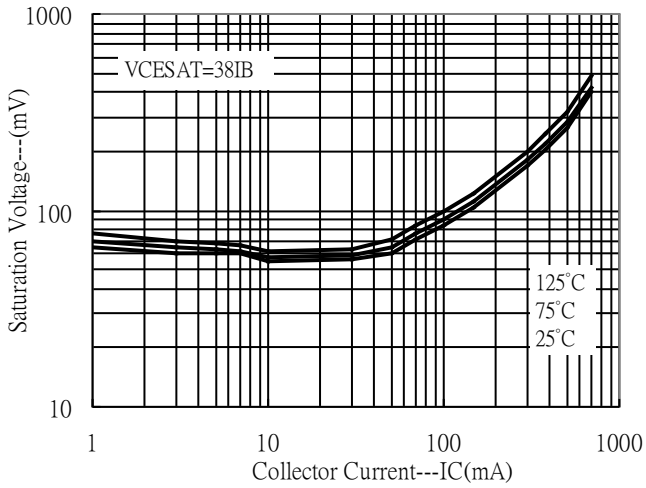


NPN Transistor Typical Characteristics (Cont.)

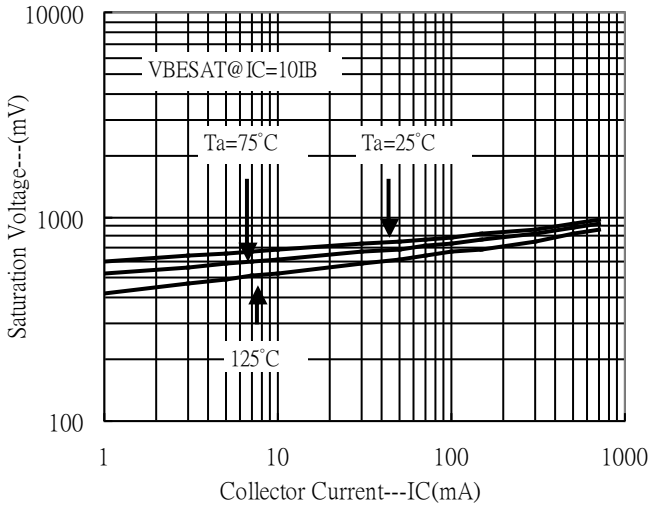
Saturation Voltage vs Collector Current



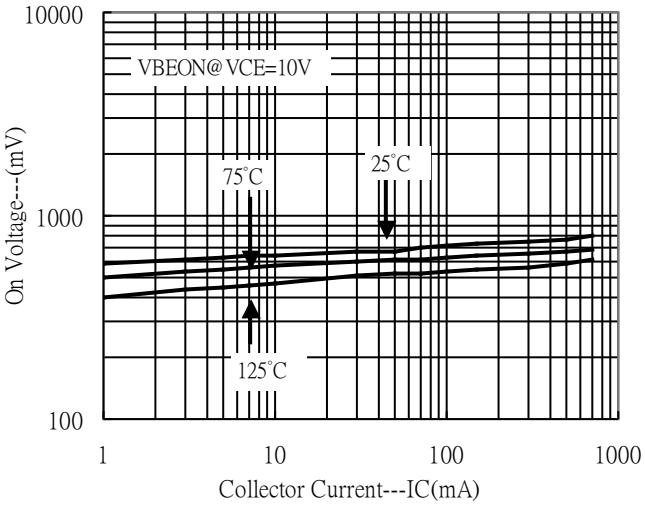
Saturation Voltage vs Collector Current



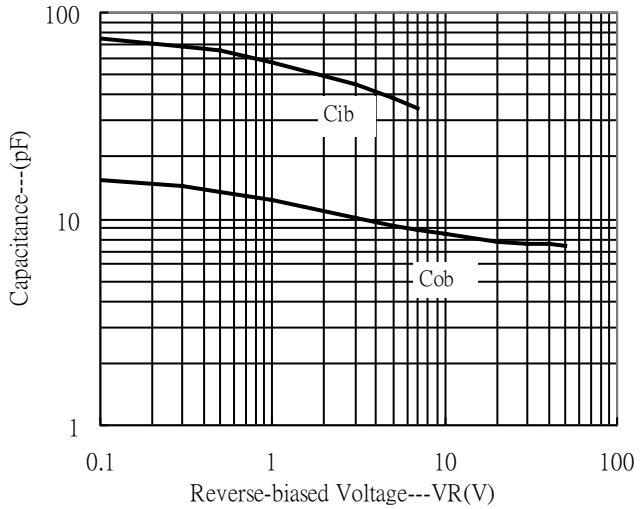
Saturation Voltage vs Collector Current



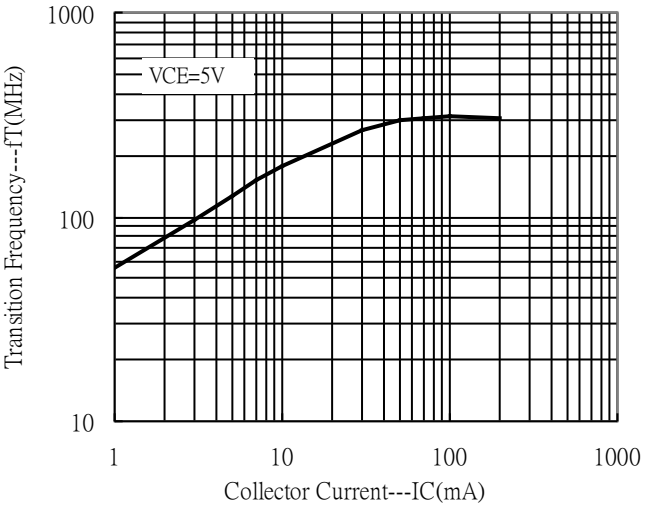
On Voltage vs Collector Current



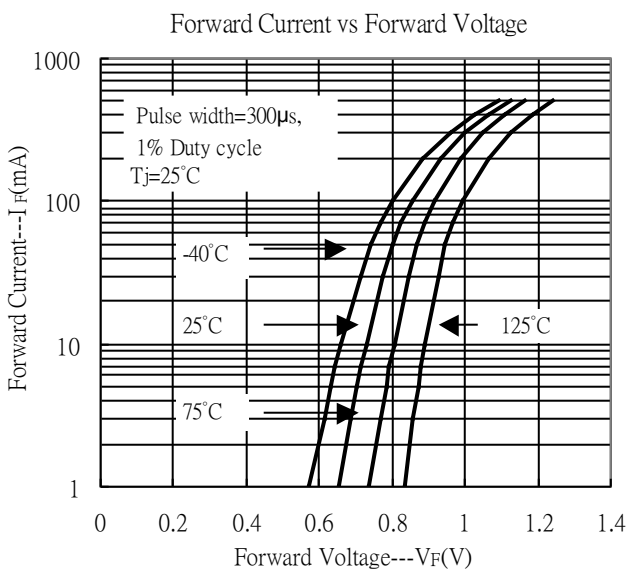
Capacitance vs Reverse-biased Voltage

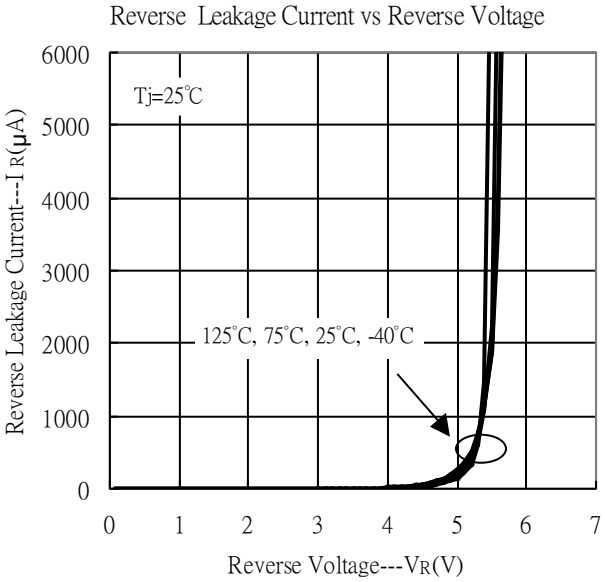


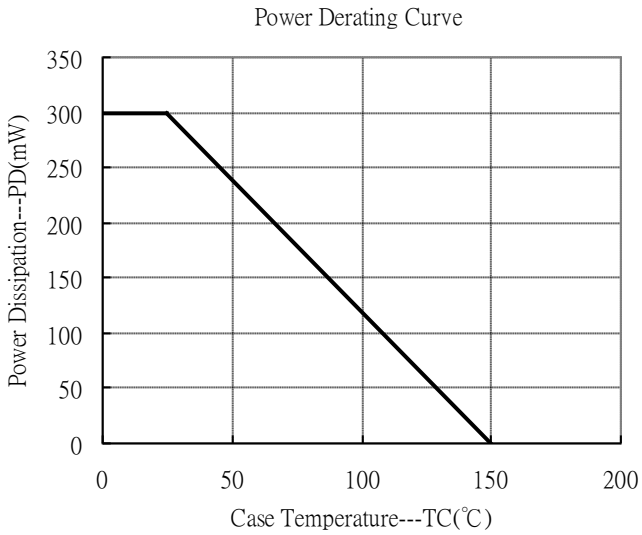
Transition Frequency vs Collector Current



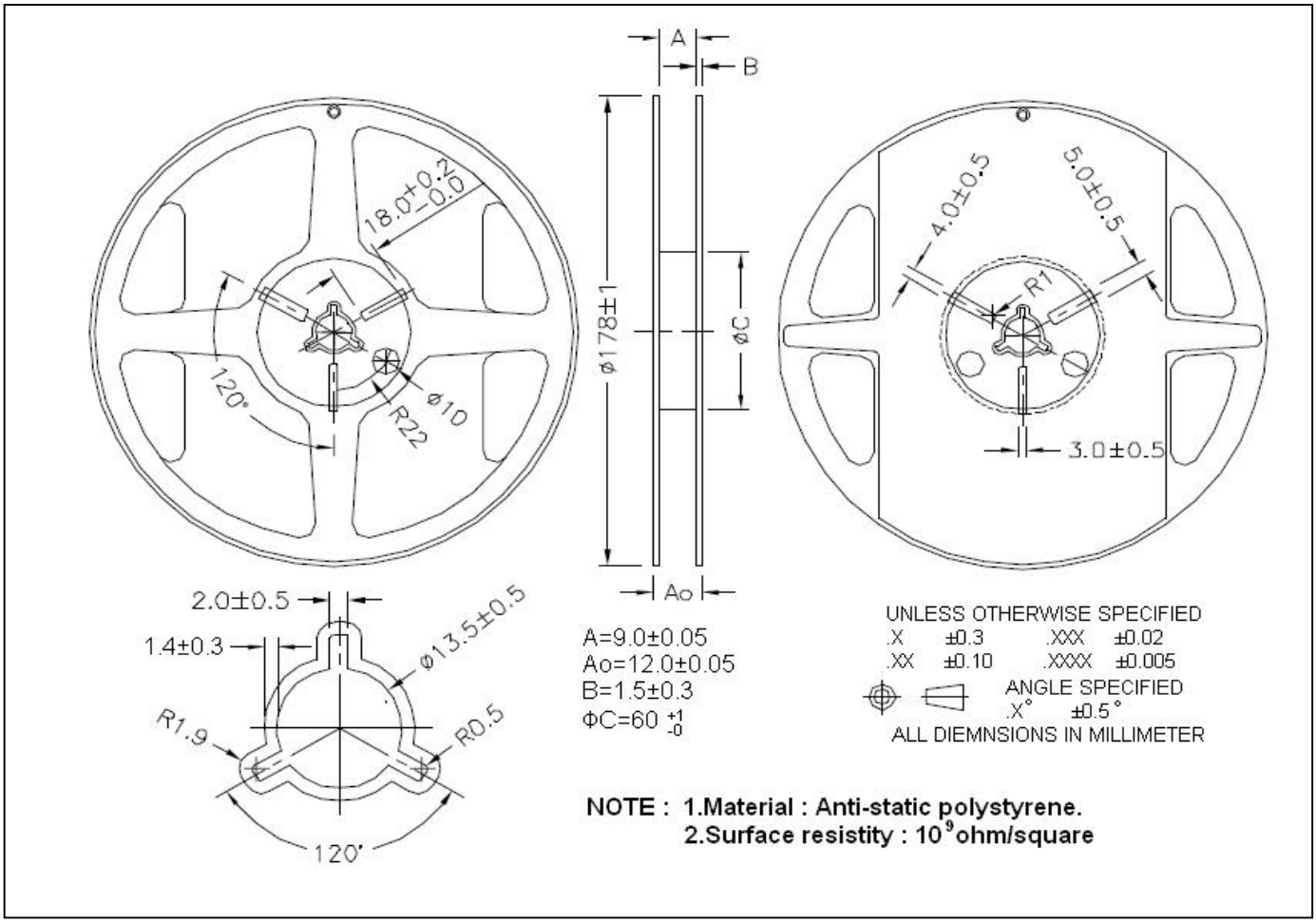
Zener Diode Typical Characteristics



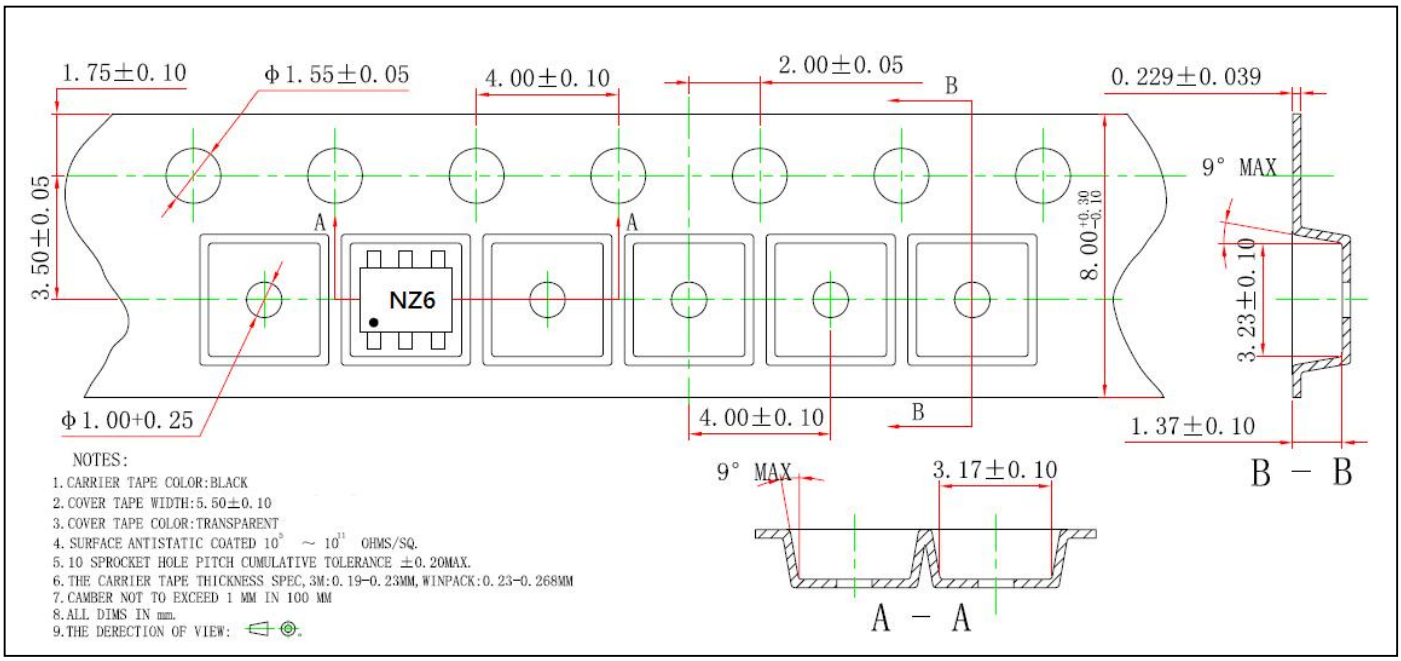




Reel Dimension



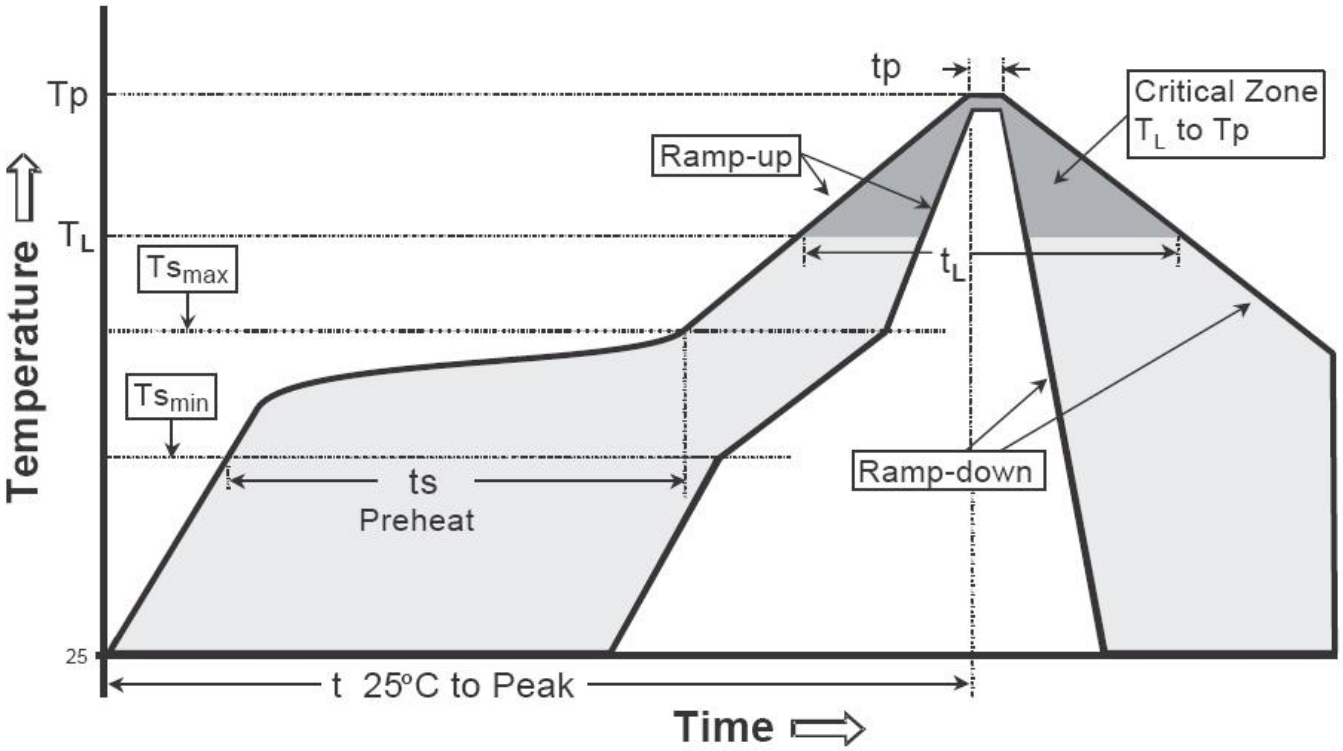
Carrier Tape Dimension



Recommended wave soldering condition

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

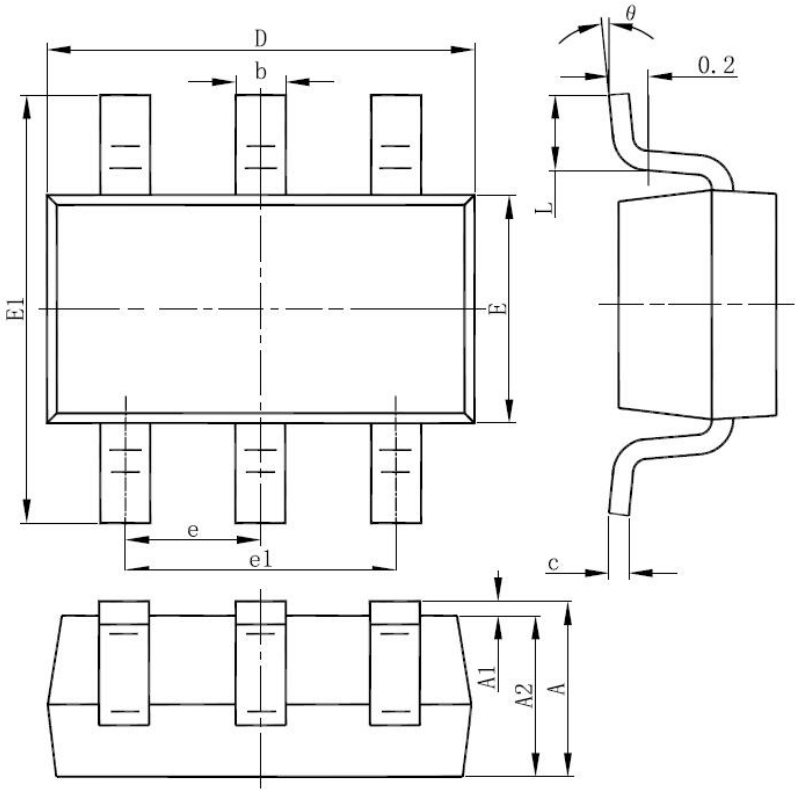
Recommended temperature profile for IR reflow

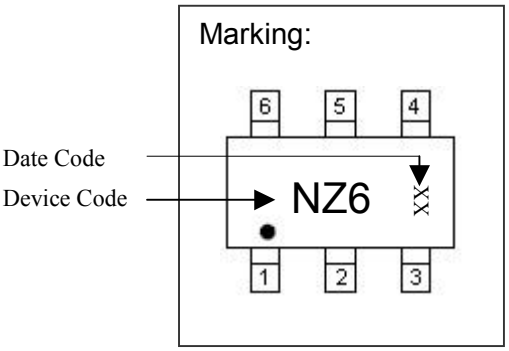


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − 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-23-6L Dimension





6Lead SOT-23-6L Plastic
Surface Mounted Package
CYStek Package Code: N6

Style:

Pin 1. Anode	(A)
Pin 2. Base	(B)
Pin 3. Collector	(C)
Pin 4. Emitter	(E)
Pin 5. Not connected	(NC)
Pin 6. Cathode	(K)

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049	E	1.500	1.700	0.059	0.067
A1	0.000	0.100	0.000	0.004	E1	2.650	2.950	0.104	0.116
A2	1.050	1.150	0.041	0.045	e	0.950 (BSC)		0.037 (BSC)	
b	0.300	0.500	0.012	0.020	e1	1.800	2.000	0.071	0.079
c	0.100	0.200	0.004	0.008	L	0.300	0.600	0.012	0.024
D	2.820	3.020	0.111	0.119	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.