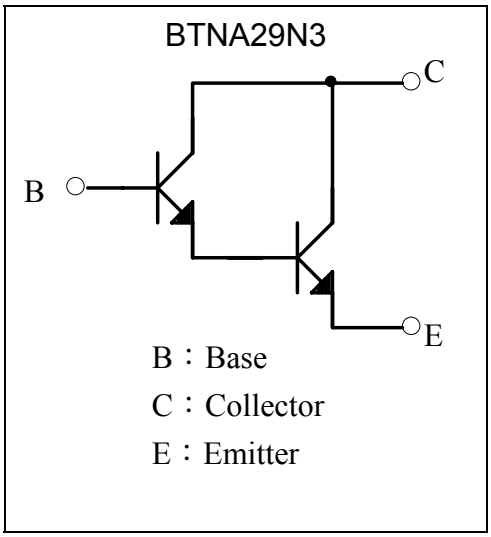
General Purpose NPN Epitaxial Planar Transistor

BTNA29N3

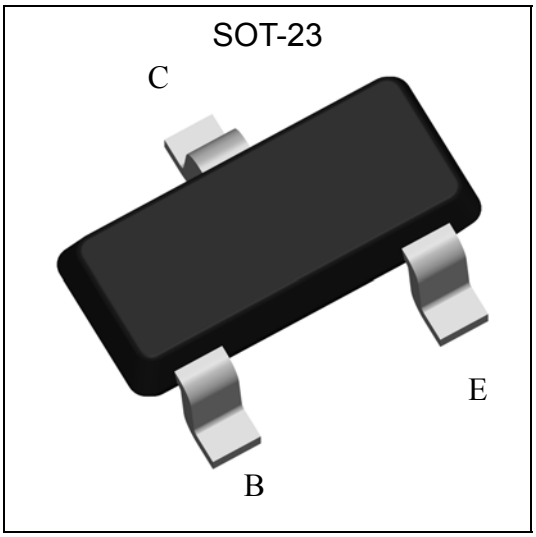
Description

- The BTNA29N3 is a darlington amplifier transistor
- Pb-free lead plating and halogen-free package

Symbol

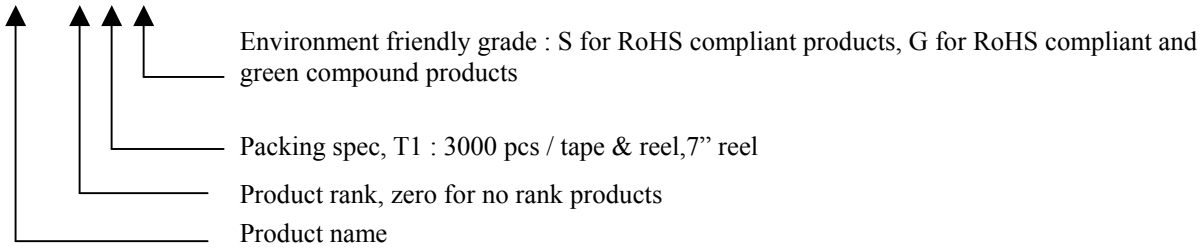


Outline



Ordering Information

Device	Package	Shipping
BTNA29N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CES}	100	V
Emitter-Base Voltage	V_{EBO}	12	V
Collector Current	I_C	0.5	A
Peak Collector Current	I_{CP}	2	A
Power Dissipation	P_D	500 (Note)	mW
Operating Junction Temperature Range	Tj	-55~+150	°C
Storage Temperature Range	Tstg	-55~+150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	190	°C/W
Thermal Resistance, Junction-to-ambient, max (Note)	$R_{\theta JA}$	250	

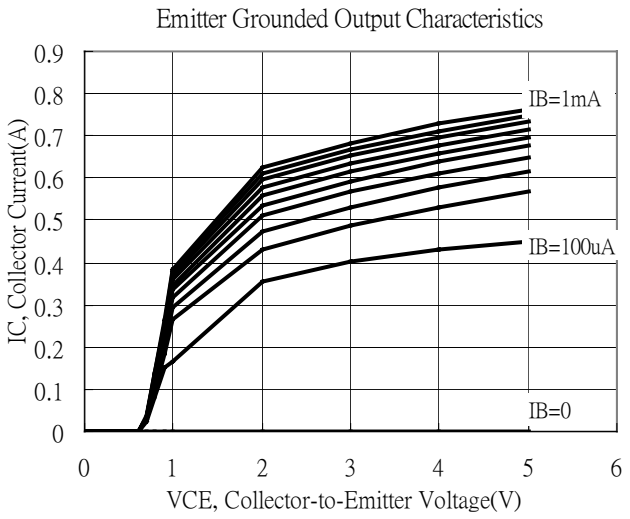
Note : Device is mounted on an FR-4 PCB, single sided, 1oz. copper, tin plated, mounting pad for collector 15mm ×15 mm.

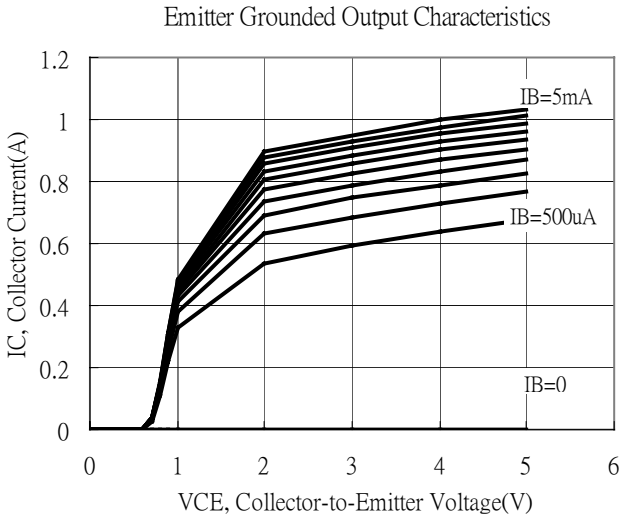
Characteristics (Ta=25°C)

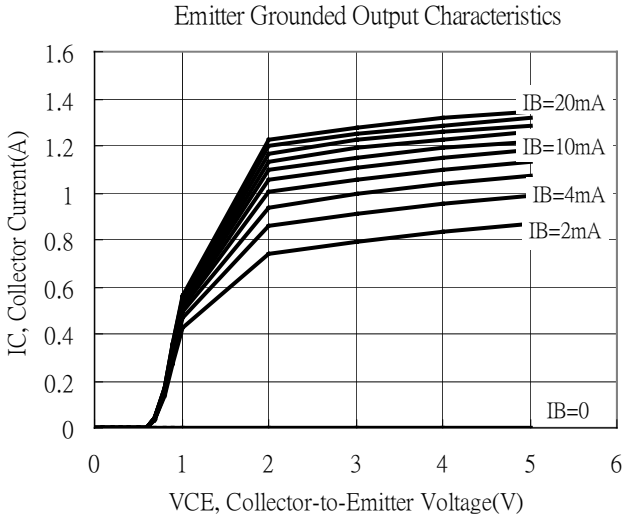
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{CBO}	100	145	-	V	I_C=100μA
BV_{CES}	100	135	-	V	I_C=100μA, V_{BE}=0V
BV_{EBO}	12	18	-	V	I_E=10μA
I_{CBO}	-	-	100	nA	V_{CB}=80V
I_{CES}	-	-	500	nA	V_{CE}=80V
I_{EBO}	-	-	100	nA	V_{EB}=10V
*$V_{CE(sat)}$	-	0.71	1.0	V	I_C=10mA, I_B=0.01mA
*$V_{CE(sat)}$	-	0.84	1.1	V	I_C=100mA, I_B=0.1mA
*$V_{CE(sat)}$	-	-	1.2	V	I_C=500mA, I_B=5mA
*$V_{BE(sat)}$	-	1.4	1.8	V	I_C=100mA, I_B=0.1mA
*$V_{BE(on)}$	-	1.35	2.0	V	V_{CE}=5V, I_C=100mA
*h_{FE} 1	10K	-	-		V_{CE}=5V, I_C=10mA
*h_{FE} 2	15K	-	-		V_{CE}=5V, I_C=100mA
*h_{FE} 3	1K	-	-		V_{CE}=5V, I_C=500mA
fT	125	200	-	MHz	V_{CE}=5V, I_C=10mA, f=100MHz
Cob	-	5	8	pF	V_{CB}=10V, f=100MHz

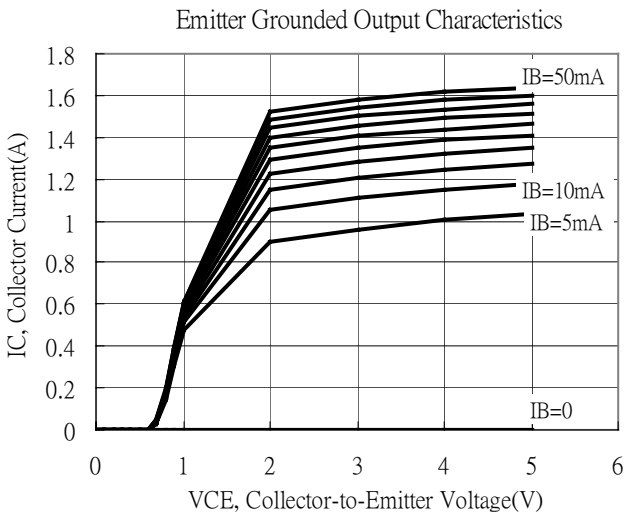
*Pulse Test: Pulse Width ≤300μs, Duty Cycle≤2%

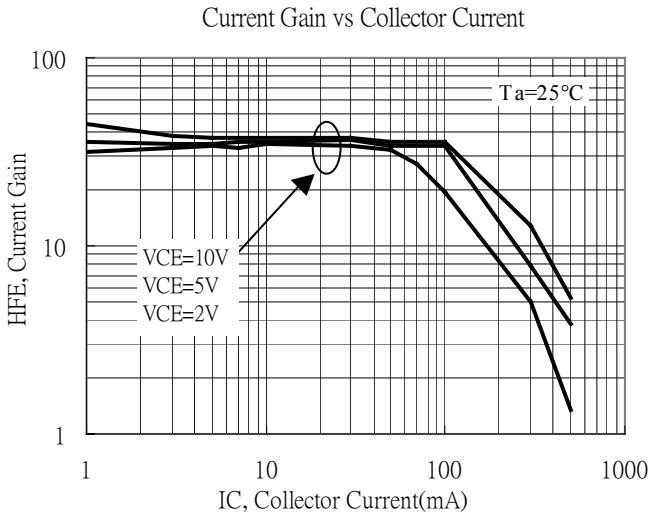
Typical Characteristics

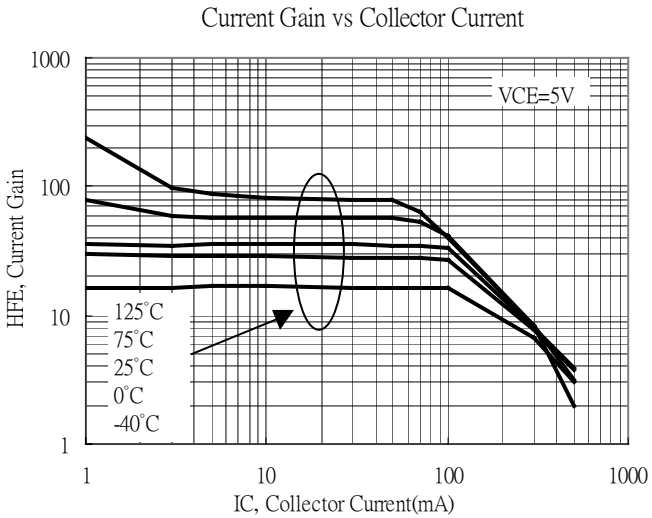






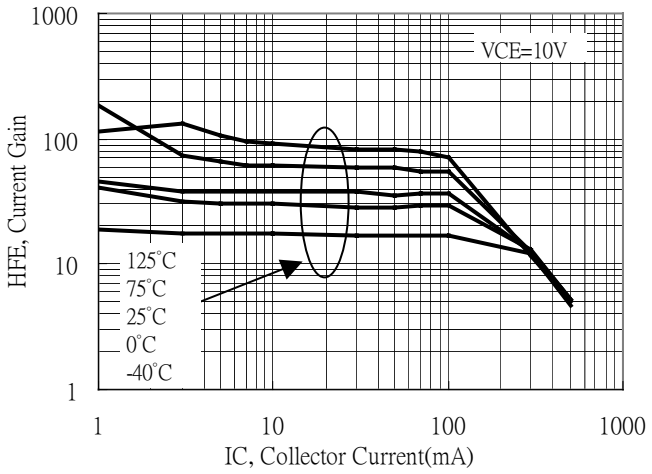




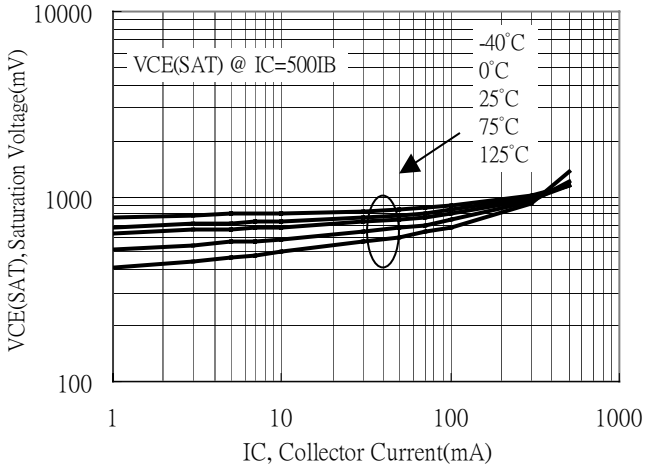


Typical Characteristics(Cont.)

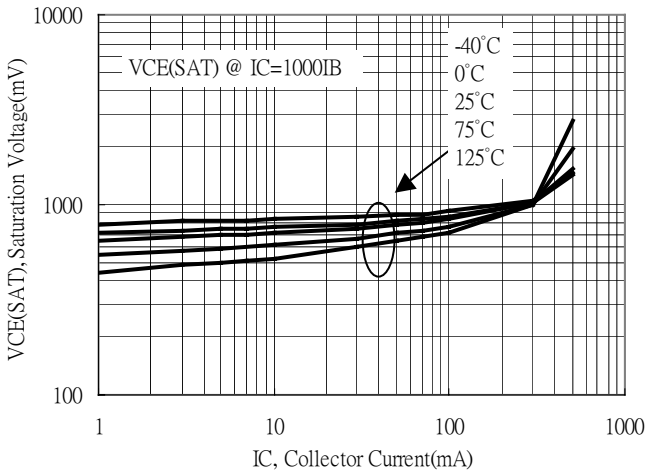
Current Gain vs Collector Current



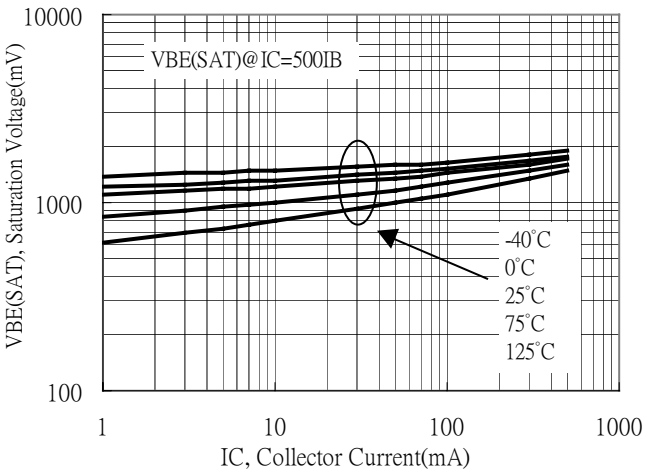
Saturation Voltage vs Collector Current



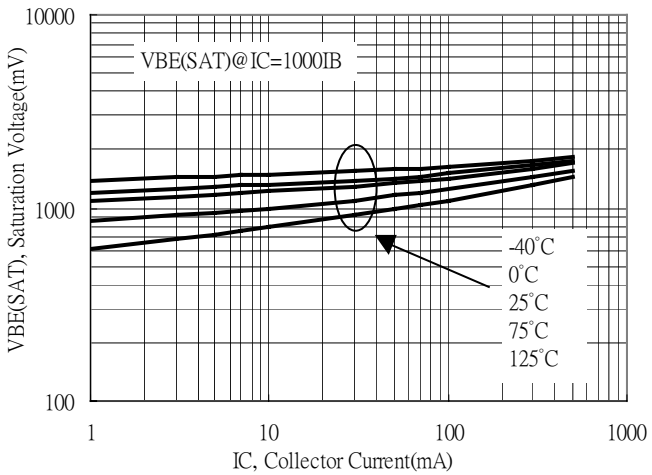
Saturation Voltage vs Collector Current



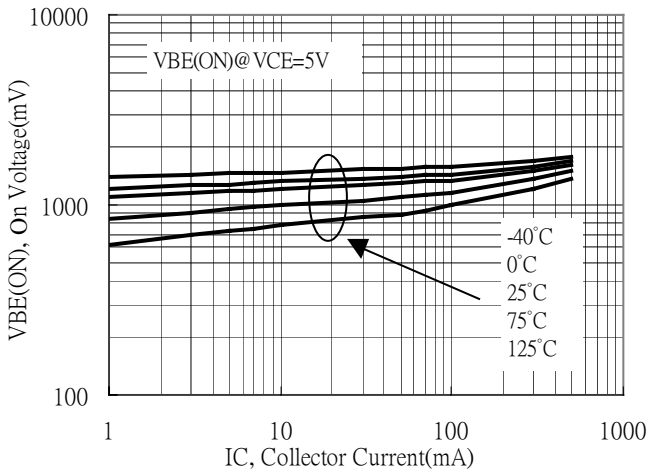
Saturation Voltage vs Collector Current



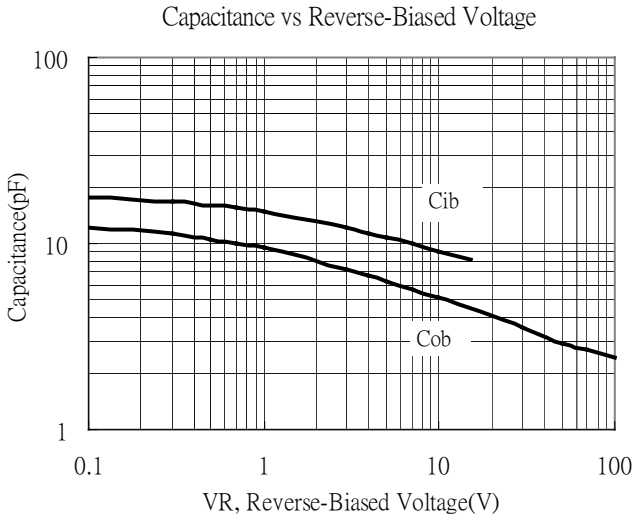
Saturation Voltage vs Collector Current

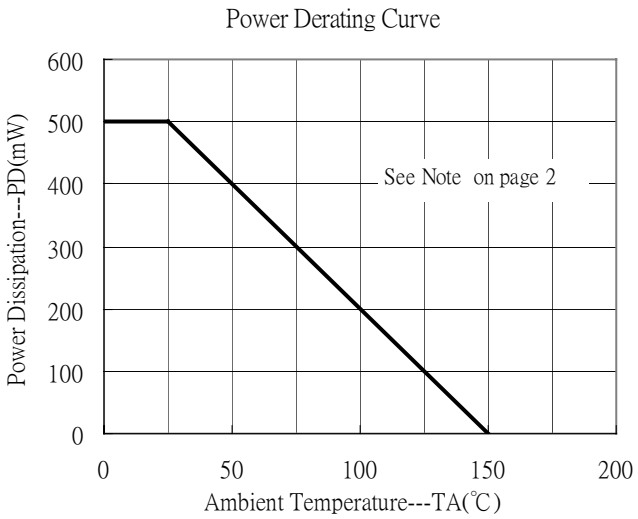


Saturation Voltage vs Collector Current

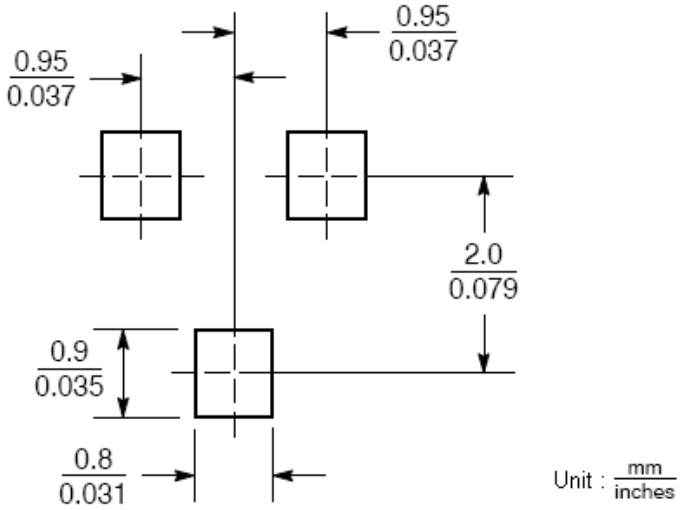


Typical Characteristics(Cont.)

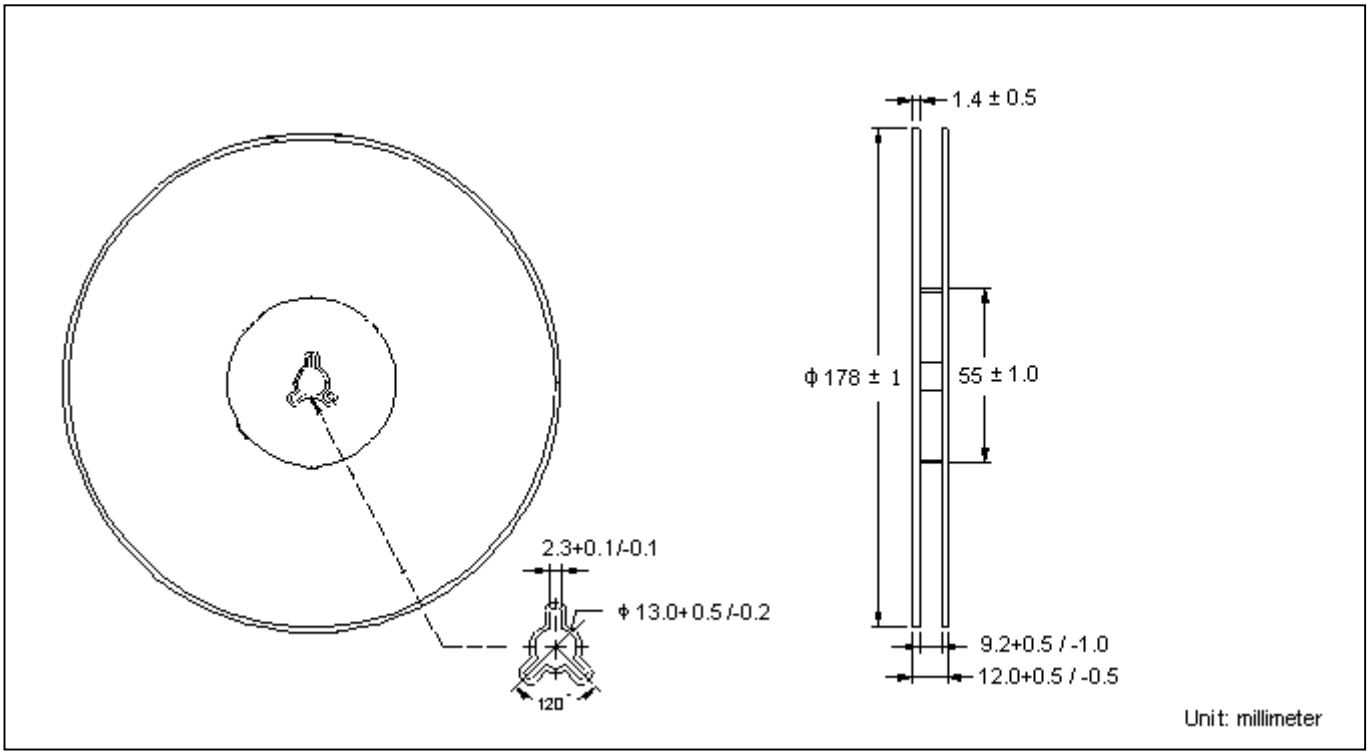




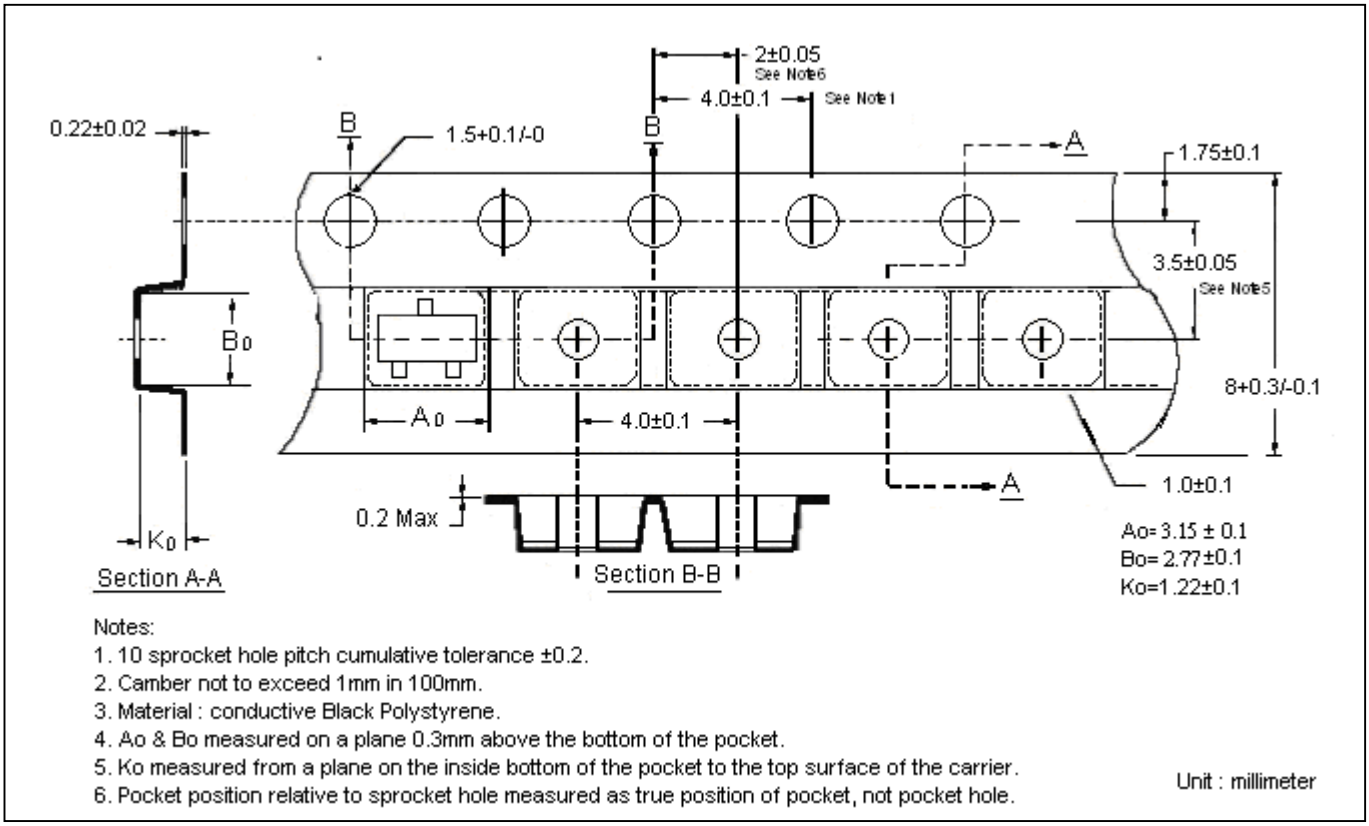
Recommended Soldering Footprint



Reel Dimension



Carrier Tape Dimension



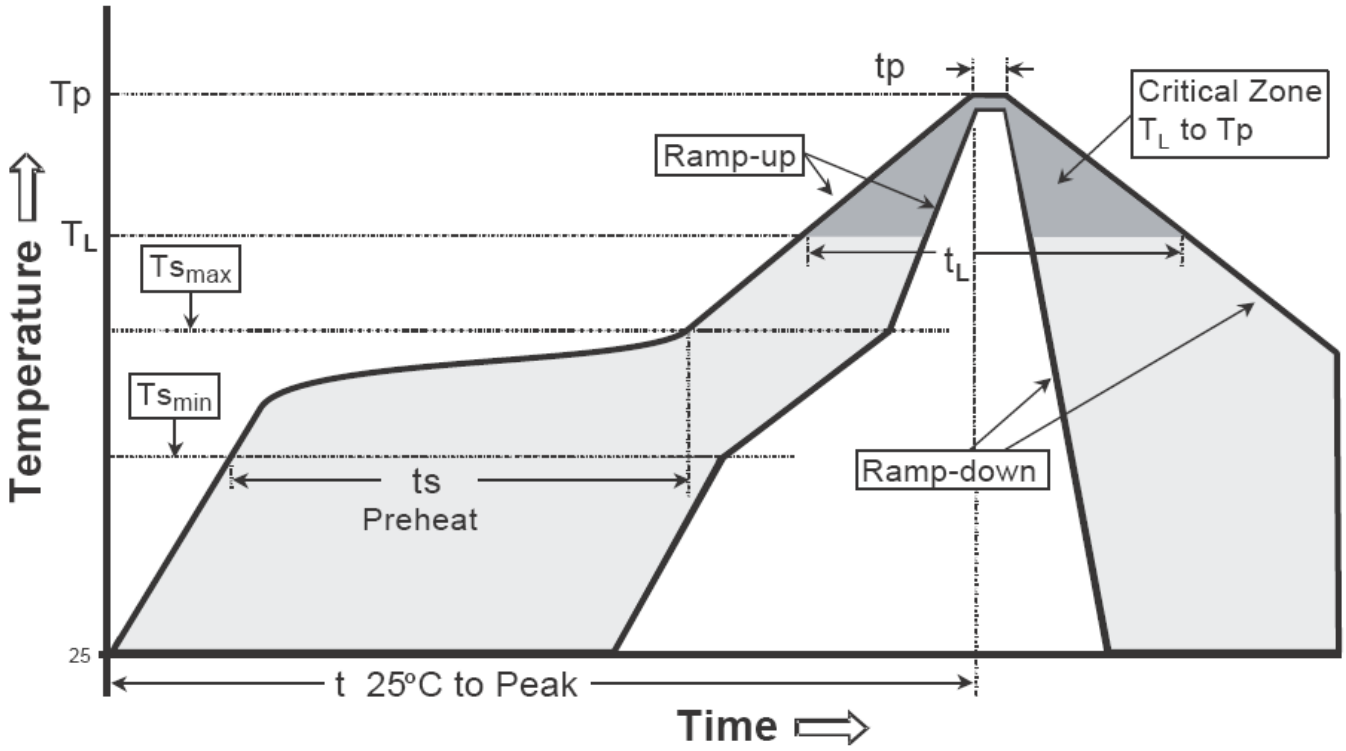
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

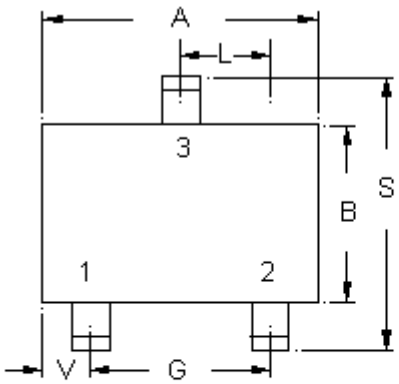
Recommended temperature profile for IR reflow



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.

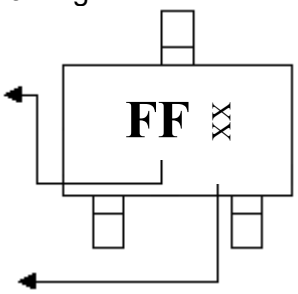
SOT-23 Dimension

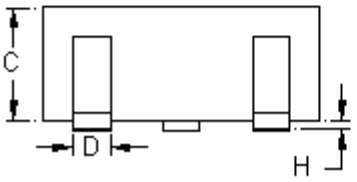


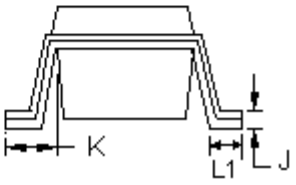
Product Code

Date Code: Year+Month
Year: 6→2016, 7→2017
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	0.0032	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.