



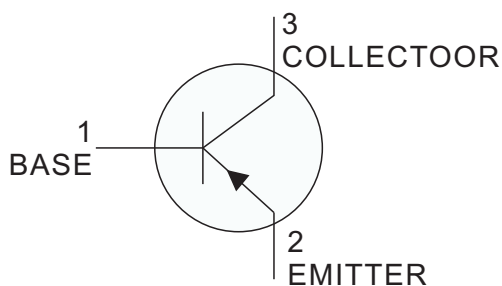
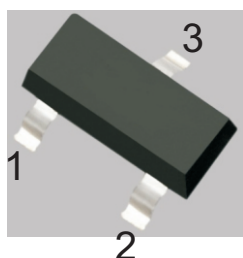
General Purpose Transistor

PNP Silicon

FEATURES

- High Collector Current
- Complementary To S9013
- Excellent hFE Linearity

SOT-23



DEVICE MARKING  
S9012 = 2T1

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	-25	Vdc
Collector–Base Voltage	$V_{CBO}$	-40	Vdc
Emitter–Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current — Continuous	$I_c$	-500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1) $T_A = 25^\circ\text{C}$	$P_D$	300	mW
Junction and Storage Temperature	$T_J, T_{stg}$	- 55 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS (TA = 25°C unless otherwise noted.)  
OFF CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage(3) ( $I_c = -1.0 \text{ mAdc}, I_B = 0$ )	$V_{(BR)CEO}$	-25	–	Vdc
Collector–Base Breakdown Voltage ( $I_c = -0.1 \text{ mAdc}, I_E = 0$ )	$V_{(BR)CBO}$	-40	–	Vdc
Emitter–Base Breakdown Voltage ( $I_E = -0.1 \text{ mAdc}, I_c = 0$ )	$V_{(BR)EBO}$	-5.0	–	Vdc
Collector cut-off current ( $V_{CB} = -40 \text{ Vdc}, I_E = 0$ )	$I_{CBO}$	–	-0.1	$\mu\text{Adc}$
Collector cut-off current ( $V_{CE} = -20 \text{ Vdc}, I_B = 0$ )	$I_{CEO}$	–	-0.1	$\mu\text{Adc}$
Emitter cut-off current ( $V_{EB} = -5 \text{ Vdc}, I_c = 0$ )	$I_{EBO}$	–	-0.1	$\mu\text{Adc}$

1. FR–5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

3. Pulse Test: Pulse Width <300  $\mu\text{s}$ , Duty Cycle <2.0%.



**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)  
ON CHARACTERISTICS (3)**

Characteristic	Symbol	Min	Max	Unit
DC Current Gain	h <sub>FE</sub>			—
(I <sub>C</sub> = -50 mA <sub>dc</sub> , V <sub>CE</sub> = -1 V <sub>dc</sub> )		120	400	
Collector–Emitter Saturation Voltage	V <sub>CE(sat)</sub>			V <sub>dc</sub>
(I <sub>C</sub> = -500 mA <sub>dc</sub> , I <sub>B</sub> = -50 mA <sub>dc</sub> )(3)		—	-0.6	
Base–Emitter Saturation Voltage(3)	V <sub>BE(sat)</sub>			V <sub>dc</sub>
(I <sub>C</sub> = -500 mA <sub>dc</sub> , I <sub>B</sub> = -50mA <sub>dc</sub> )		—	-1.2	

**SMALL–SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product (I <sub>C</sub> = -20mA <sub>dc</sub> , V <sub>CE</sub> = -6.0V <sub>dc</sub> , f = 30MHz)	f <sub>T</sub>	150	—	MHz
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**CLASSIFICATION OF h<sub>FE</sub>**

Rank	L	H	J
Range	120-200	200-350	300-400

3. Pulse Test: Pulse Width <300 μs, Duty Cycle <2.0%.



### TYPICAL CHARACTERISTICS

Fig.1 Power Derating Curve

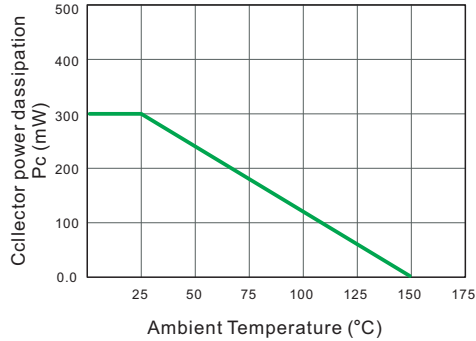


Fig.2 Static characteristics

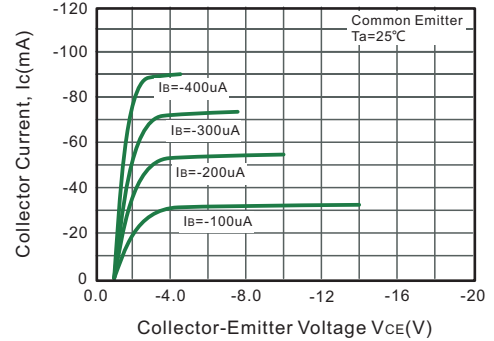


Fig.3 hFE--Ic

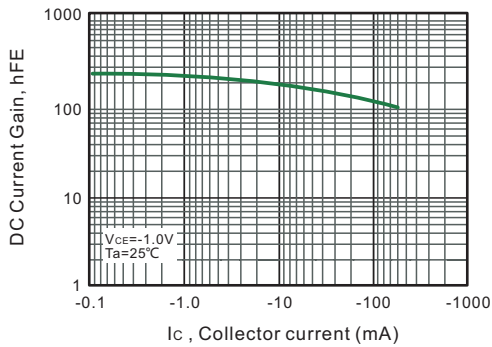


Fig.4 Ic--VBE

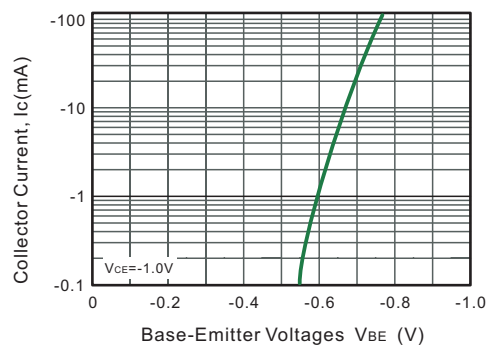


Fig.5 VBEsat--Ic

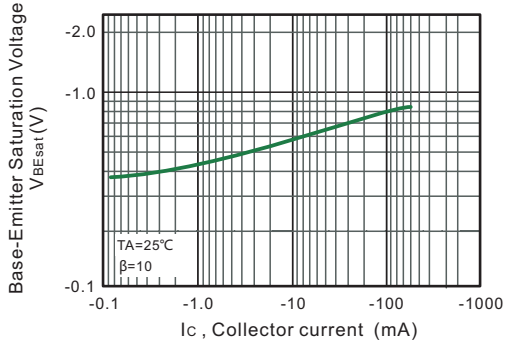


Fig.6 VCEsat--Ic

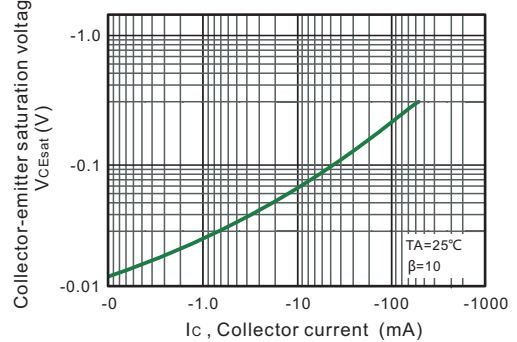


Fig.7 ft--Ic

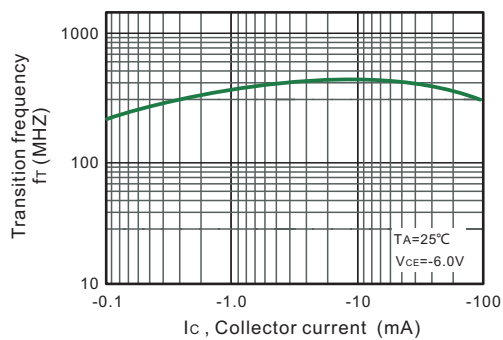
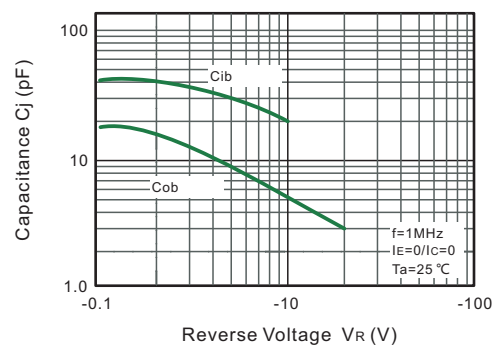
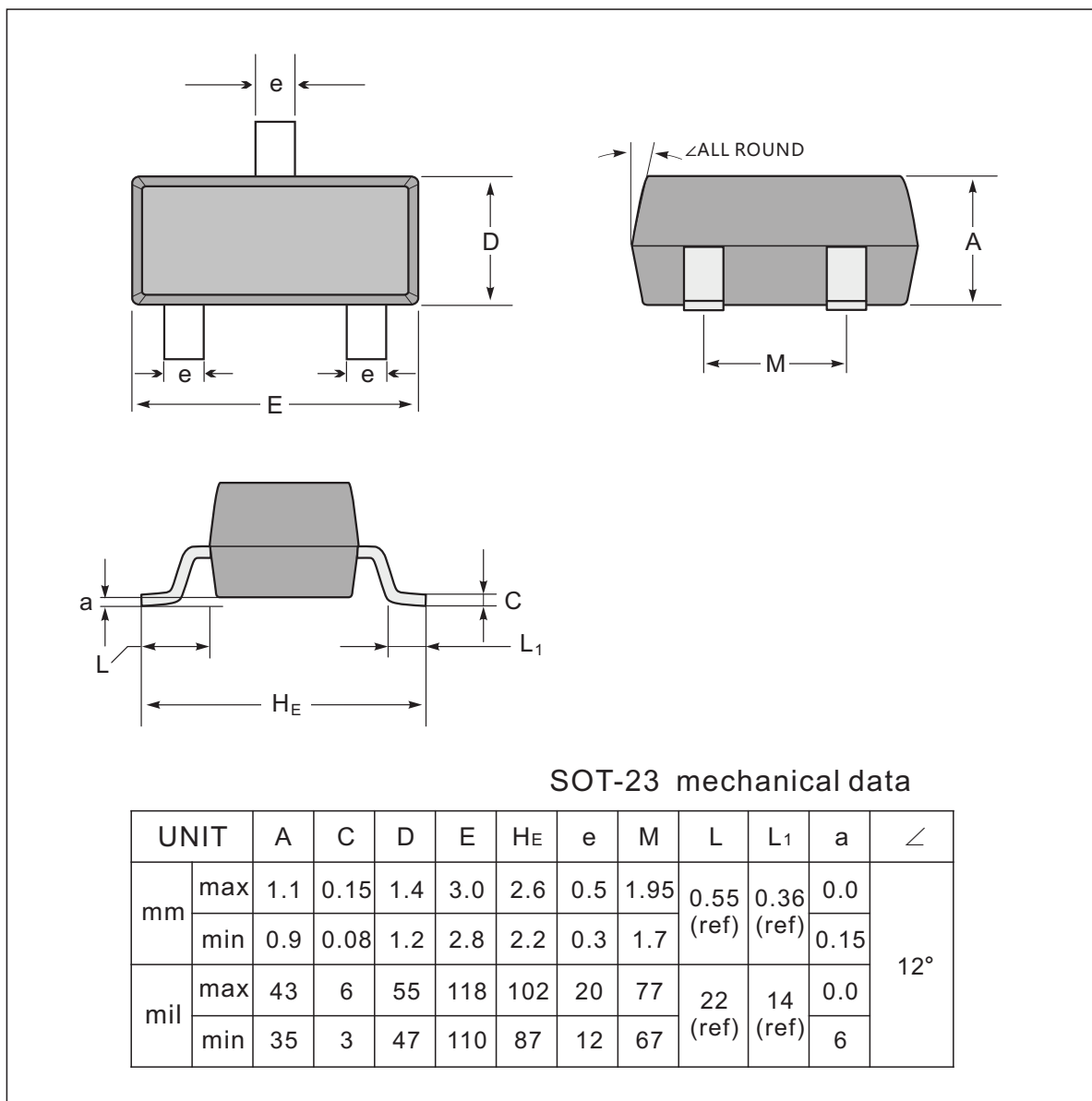


Fig.8 Cob/Cib--VCS/VEB

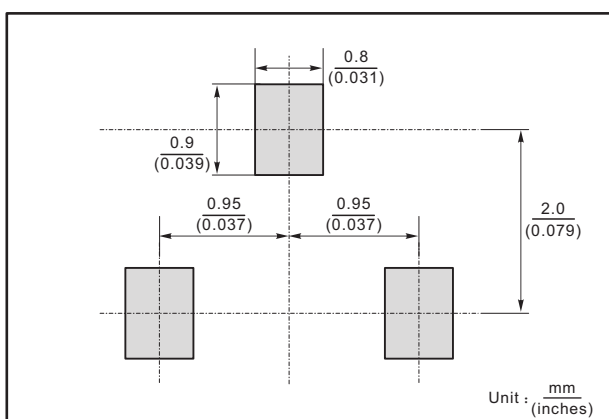




### SOT-23 Package Outline Dimensions



#### The recommended mounting pad size



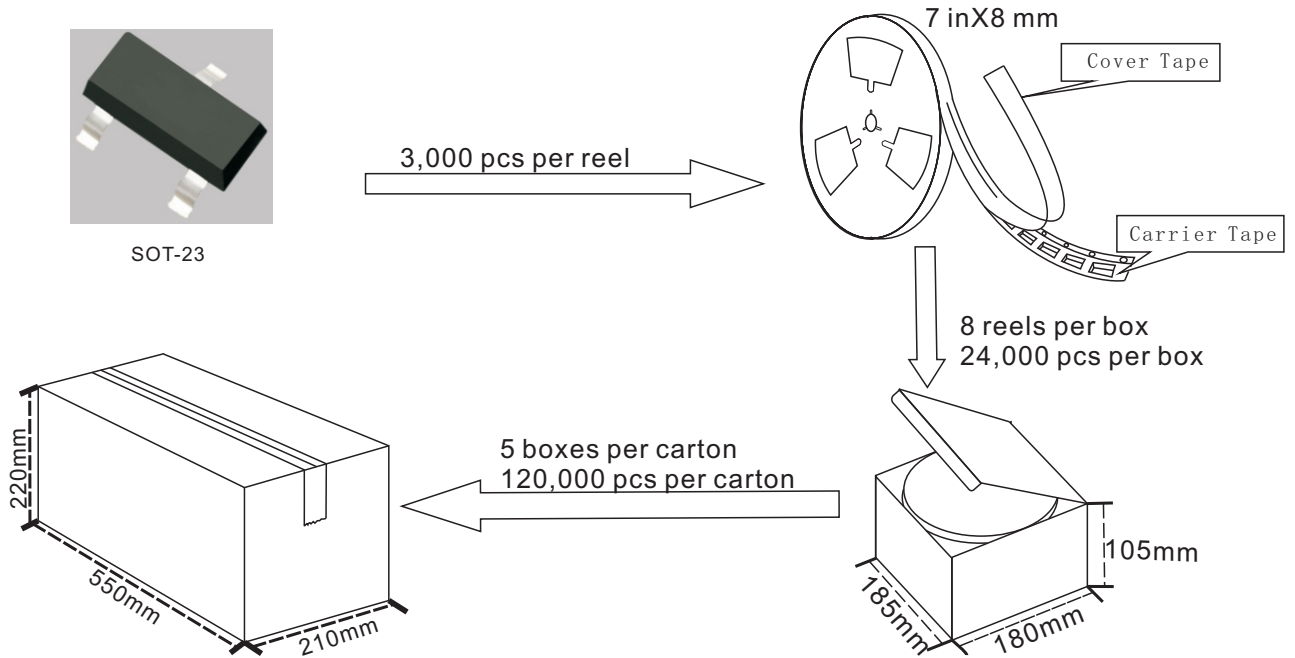
#### Marking

Type number	Marking code
S9012	2T1

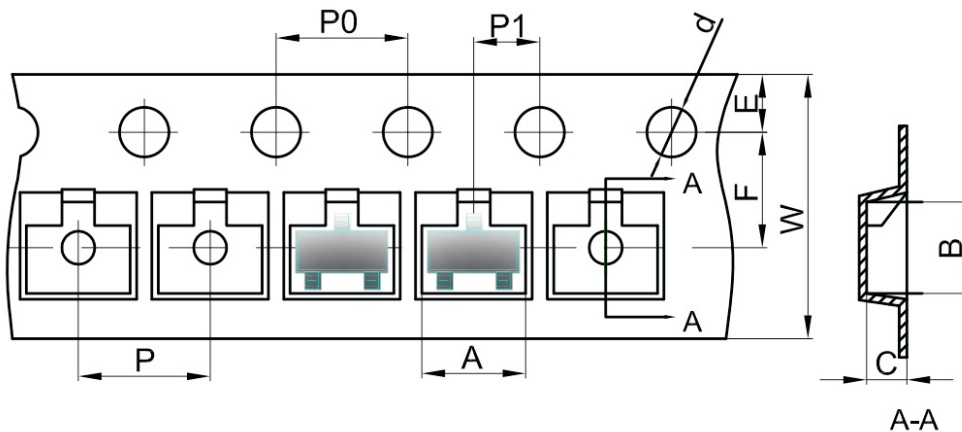


## SOT-23 Packing

1. The method of packaging and dimension are shown as below figure. (Dimension in mm)



### SOT-23 Embossed Carrier Tape



Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

### SOT-23 Tape Leader and Trailer

