



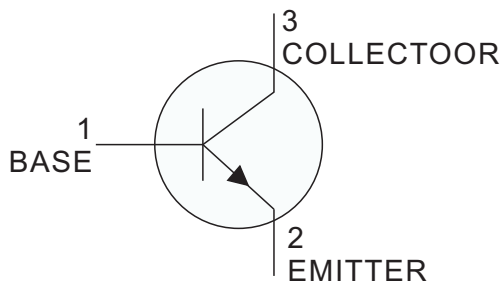
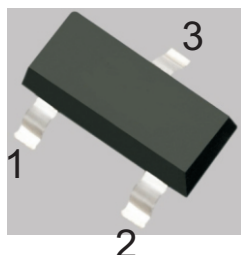
General Purpose Transistor

NPN Silicon

FEATURES

- High Collector Current.
- Complementary to S9012.
- Excellent hFE Linearity.

SOT-23



DEVICE MARKING
S9013 = J3

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 ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

OFF CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
Collector–Emitter Breakdown Voltage(3) ($I_C = 1.0 \text{ mAdc}, I_E = 0$)	$V_{(BR)CEO}$	25	–	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	40	–	Vdc
Emitter–Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	5.0	–	Vdc
Collector cut-off current ($V_{CB} = 40 \text{ Vdc}, I_E = 0$)	I_{CBO}	–	0.1	μAdc
Collector cut-off current ($V_{CE} = 20 \text{ Vdc}, I_B = 0$)	I_{CEO}	–	0.1	μAdc
Emitter cut-off current ($V_{EB} = 5 \text{ Vdc}, I_C = 0$)	I_{EBO}	–	0.1	μAdc

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 μs , Duty Cycle <2.0%.



**ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)
ON CHARACTERISTICS (3)**

Characteristic	Symbol	Min	Max	Unit
DC Current Gain	h _{FE}			—
(I _C = 50 mA, V _{CE} = 1 V)		120	400	
(I _C = 500 mA, V _{CE} = 1 V)		40	—	
Collector–Emitter Saturation Voltage	V _{CE(sat)}			V _{dc}
(I _C = 500 mA, I _B = 50 mA)(3)		—	0.6	
Base–Emitter Saturation Voltage(3)	V _{BE(sat)}			V _{dc}
(I _C = 500 mA, I _B = 50 mA)		—	1.2	
Base-emitter voltage (V _{CB} =1V, I _C =10mA)	V _{BE}	—	0.7	

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I _C = 20mA, V _{CE} = 6.0V, f = 30MHz)	f _T	150	—	MHz
Collector output capacitance (V _{CB} = 6.0V, I _E = 0, f = 1.0 MHz)	C _{ob}	—	8.0	pF

CLASSIFICATION OF h_{FE}

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

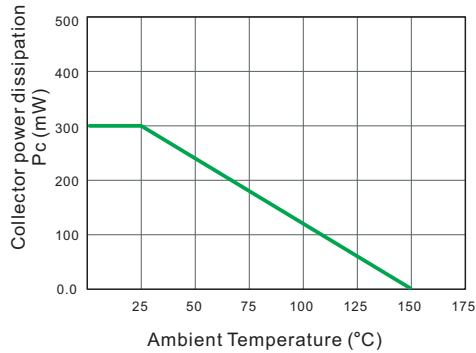


Fig.2 Static characteristics

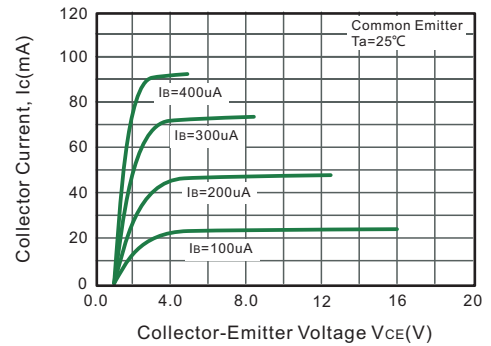


Fig.3 hFE--Ic

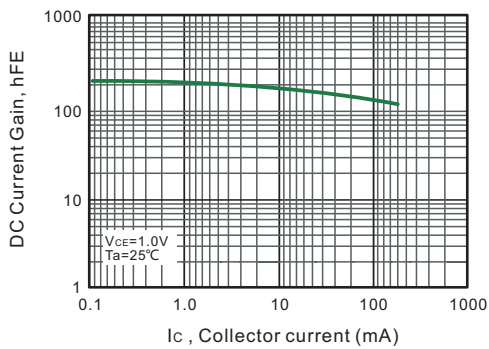


Fig.4 Ic--VBE

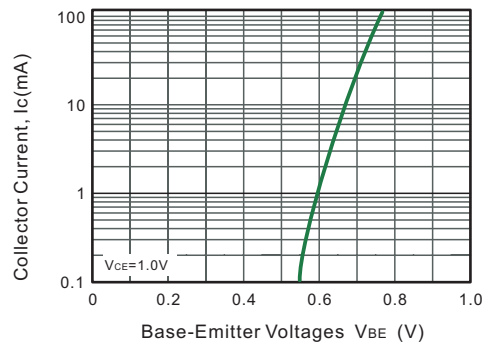


Fig.5 VBEsat--Ic

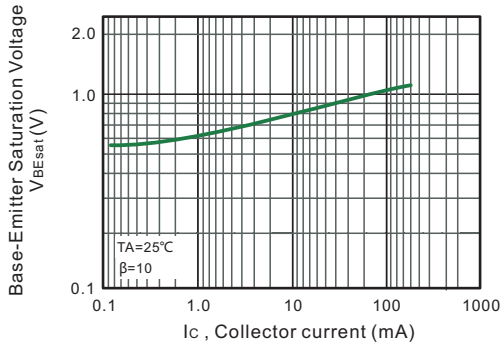


Fig.6 VCEsat--Ic

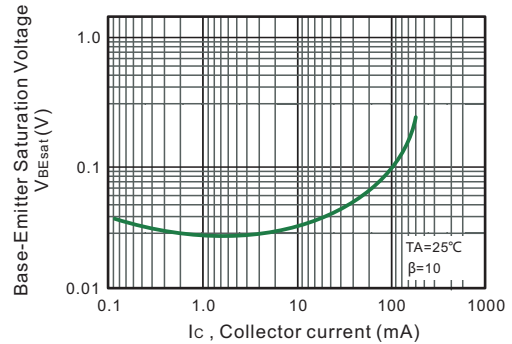


Fig.7 ft--Ic

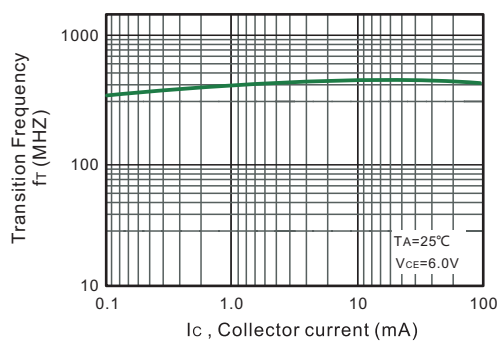
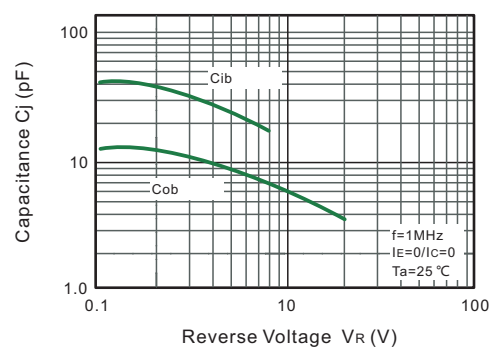
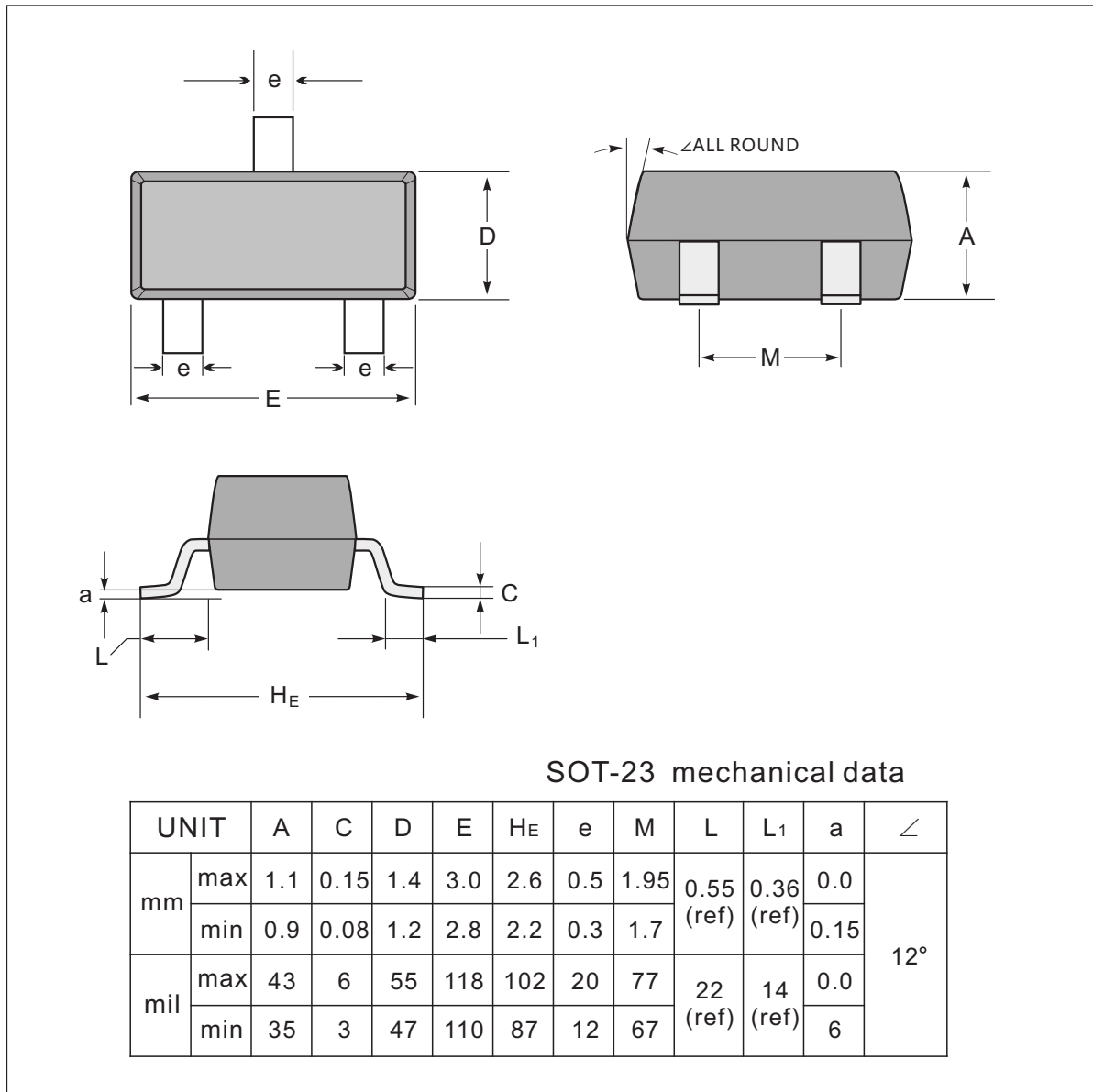


Fig.8 Cob/Cib--VCR/VEB

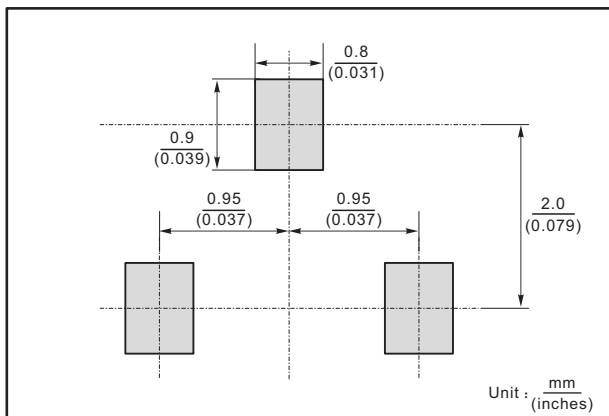




SOT-23 Package Outline Dimensions



The recommended mounting pad size



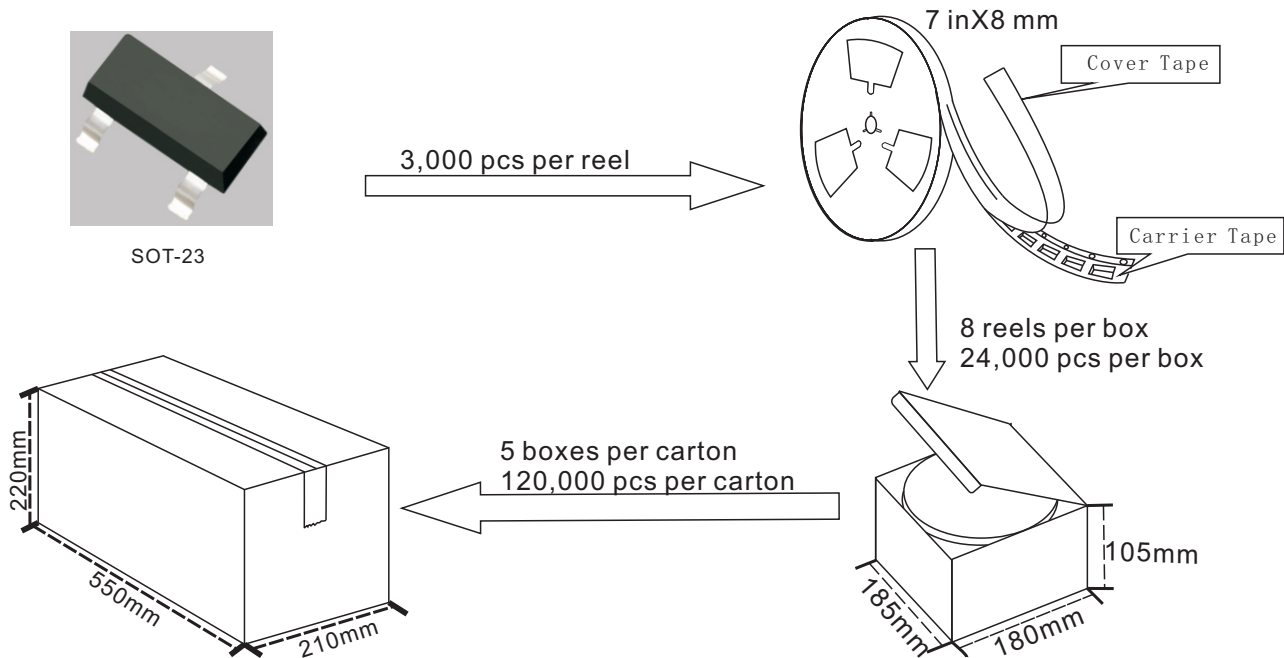
Marking

Type number	Marking code
S9013	J3

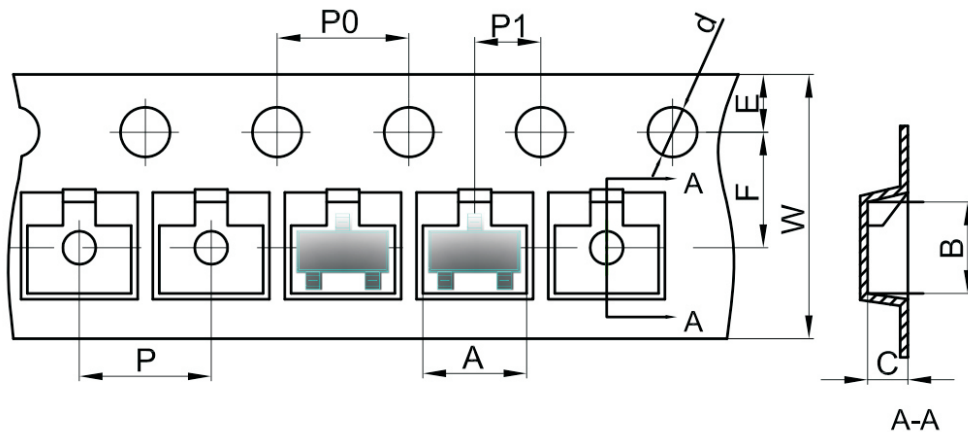


SOT-23 Packing

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

