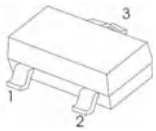
SOT-23



1.BASE
2.EMITTER
3.COLLECTOR

FEATURES

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

Marking

Type number	Marking code
S9012	2T1

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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°C	P_D	300	mW
Junction and Storage Temperature	T_J, T_{stg}	– 55 to +150	°C

CLASSIFICATION OF h_{FE}

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

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

OFF CHARACTERISTICS

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

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%.

ON CHARACTERISTICS

Characteristic	Symbol	Min	Max	Unit
DC Current Gain	h_{FE}			—
(I_C =-50 mAdc, V_{CE} =-1 Vdc)		120	400	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$			Vdc
(I_C = -500 mAdc, I_B = -50 mAdc)(3)		—	-0.6	
Base–Emitter Saturation Voltage(3)	$V_{BE(sat)}$			Vdc
(I_C = -500 mAdc, I_B = -50mAdc)		—	-1.2	

SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I_C = -20mAdc, V_{CE}= -6.0Vdc, f =30MHz)	f_T	150	—	MHz

RATING AND CHARACTERISTIC CURVES

Fig.1 Power Derating Curve

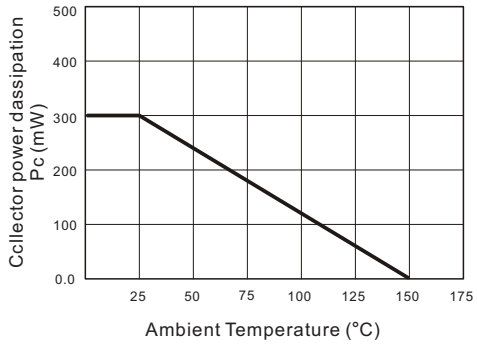


Fig.2 Static characteristics

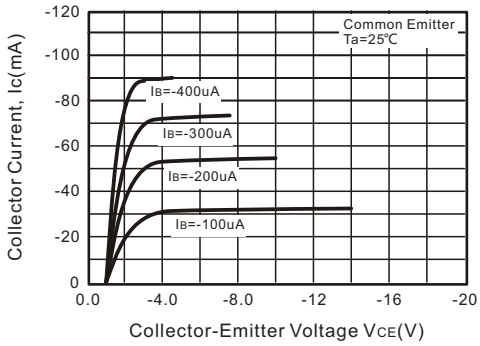


Fig.3 hFE--Ic

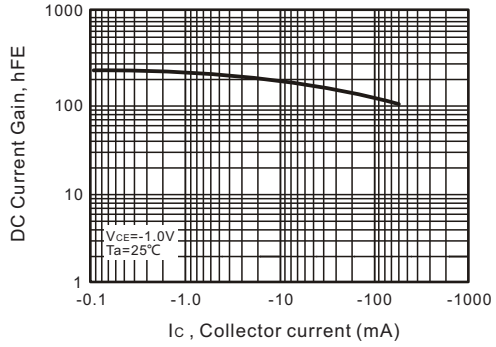


Fig.4 Ic--VBE

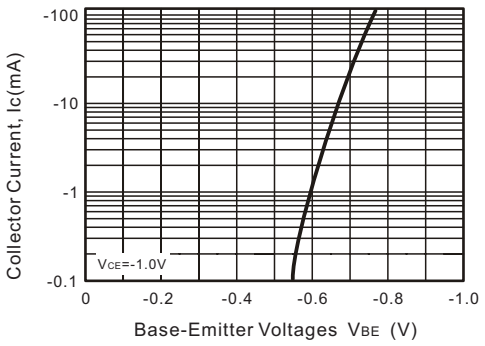


Fig.5 VBEsat--Ic

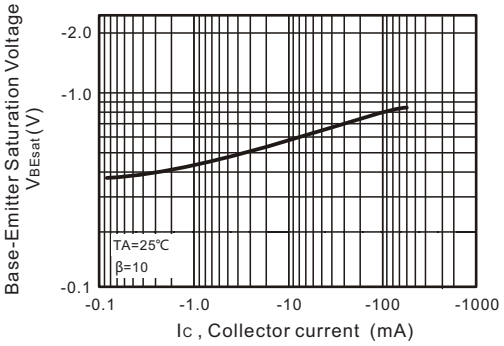


Fig.6 VCEsat--Ic

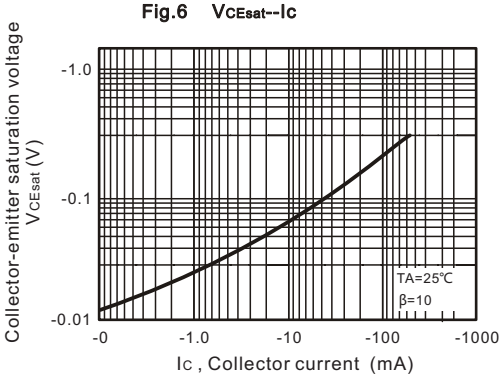


Fig.7 ft--Ic

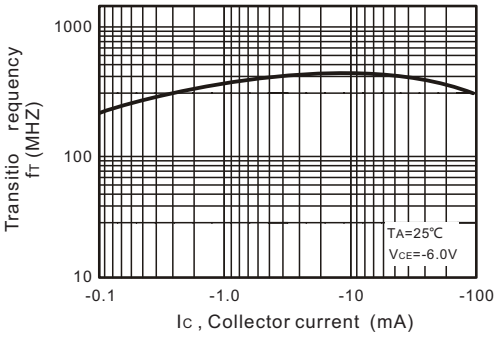
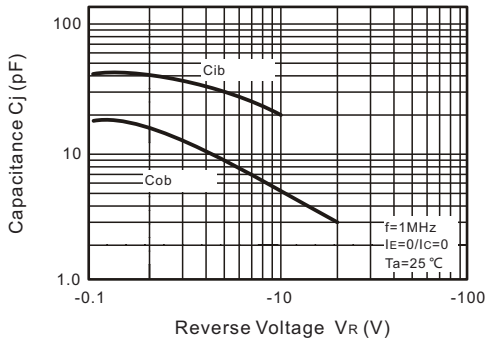


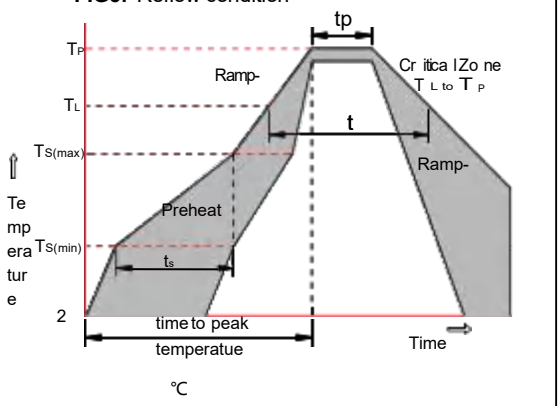
Fig.8 Cob/Cib-VCB/VEB



Soldering parameters

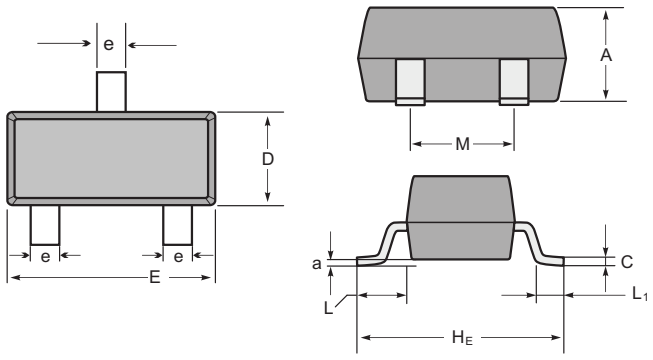
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

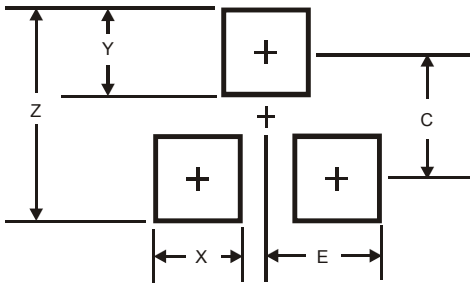
FIG5: Reflow condition



Package Dimensions & Suggested Pad Layout

SOT23





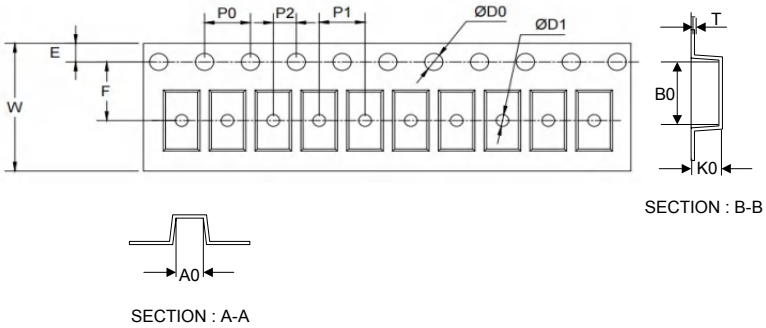
SOT-23 mechanical data

UNIT		A	C	D	E	H_E	e	M	L	L_1	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

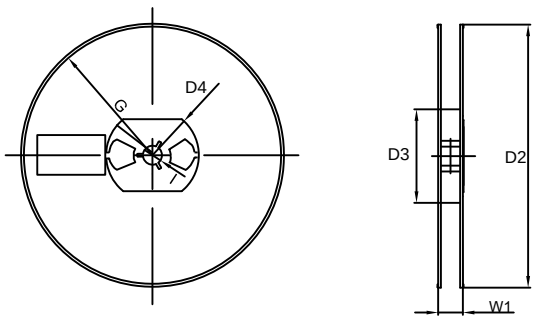
Tape & rell specification

Tape



Symbol	Dimension (mm)
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
D0	1.55±0.10
D1	1.05±0.10
E	1.55±0.10
F	3.60±0.10
W	8.00±0.10
A0	3.80±0.20
B0	3.25±0.20
K0	1.45±0.10
T	0.25±0.05

7” Reel



D2	178.0±3.0
D3	55Min.
D4	R24.0±3.0
G	R82.0±3.0
I	13.0±2.0
W1	11.0±3.0
Quantity: 3000PCS	