

## FEATURES

| High Collector Current

| Complementary To S9013

| Excellent  $h_{FE}$  Linearity



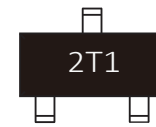
SOT-23

## MECHANICAL DATA

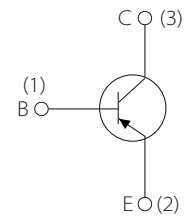
| SOT-23 small outline plastic package

| Epoxy UL: 94V-0

| Mounting position: Any



Marking



Schematic Symbol

## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003

## MAXIMUM RATINGS ( $T_A=25^{\circ}\text{C}$ )

Parameter	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-25	
Emitter-Base Voltage	$V_{EBO}$	-5	
Collector Current	$I_C$	-500	mA
Collector Power Dissipation	$P_C$	300	mW
Thermal Resistance From Junction To Ambient	$R_{\theta JA}$	416	$^{\circ}\text{C}/\text{W}$
Junction Temperature	$T_J$	-55~+150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-55~+150	$^{\circ}\text{C}$

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

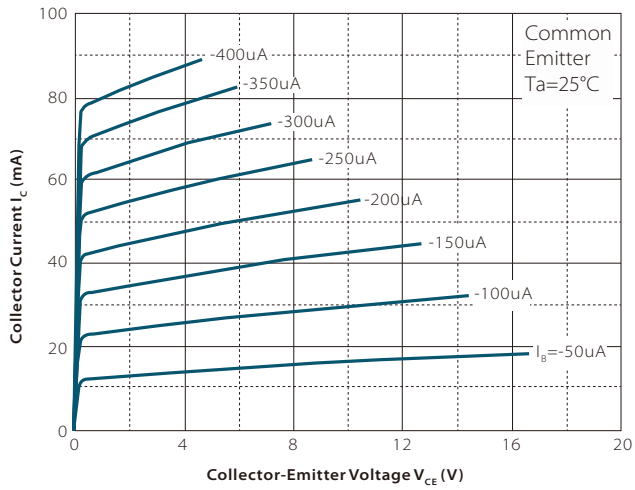
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =-0.1mA, I <sub>E</sub> =0	-40			V
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =-1mA, I <sub>B</sub> =0	-25			
Emitter-base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =-0.1mA, I <sub>C</sub> =0	-5			
Collector cut-off current	I <sub>CEO</sub>	V <sub>CE</sub> =-20V, I <sub>B</sub> =0			-0.1	uA
Emitter cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> =-40V, I <sub>E</sub> =0			-0.1	
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> =-5V, I <sub>C</sub> =0			-0.1	
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> =-1V, I <sub>C</sub> =-50mA	120		400	
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =-500mA, I <sub>B</sub> =-50mA			-0.6	V
Base-emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =-500mA, I <sub>B</sub> =-50mA			-1.2	
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> =-6V, I <sub>C</sub> =-20mA, f=30MHz	150			MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> =-10V, I <sub>E</sub> =0, f=1MHz			5	pF

## CLASSIFICATION OF H<sub>FE(1)</sub>

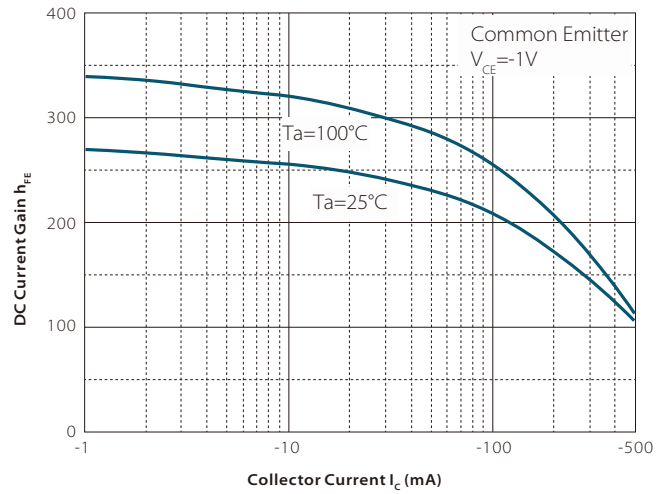
Rank	L	H	J
Range	120-200	200-350	300-400

# TYPICAL CHARACTERISTICS

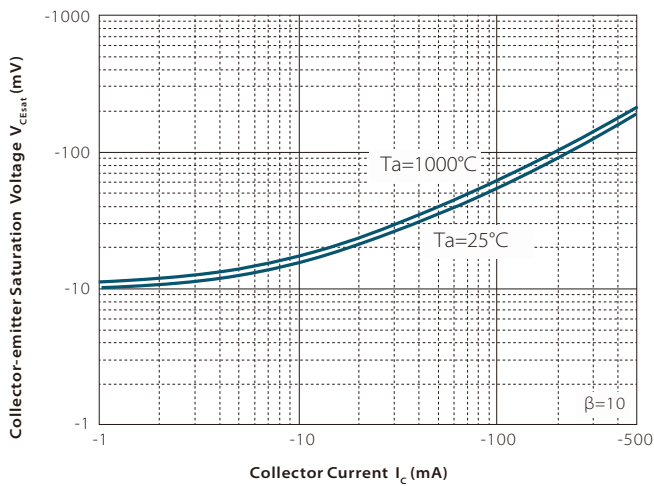
**Static Characteristic**



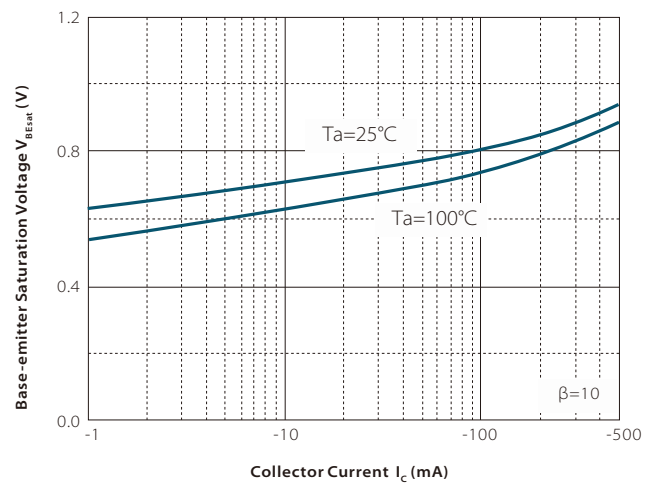
**$h_{FE}$  —  $I_C$**

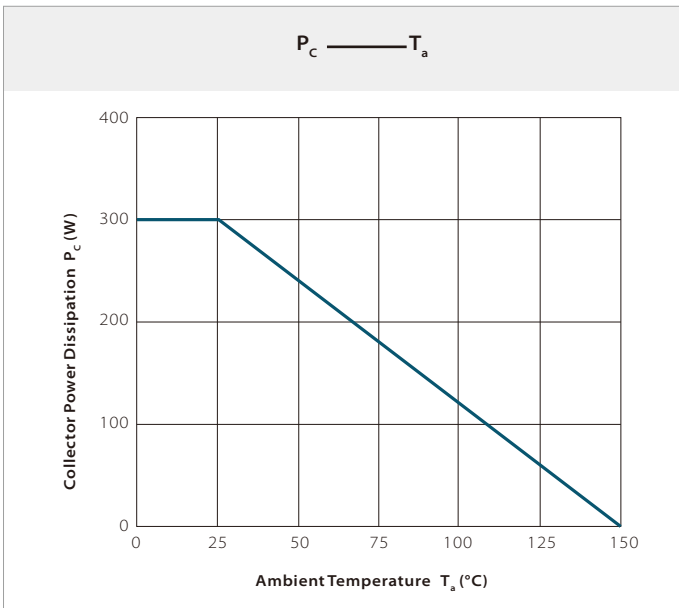
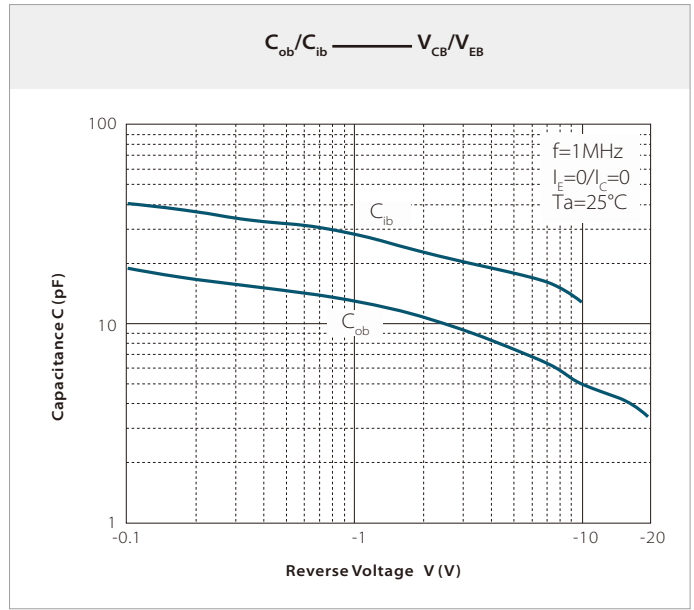
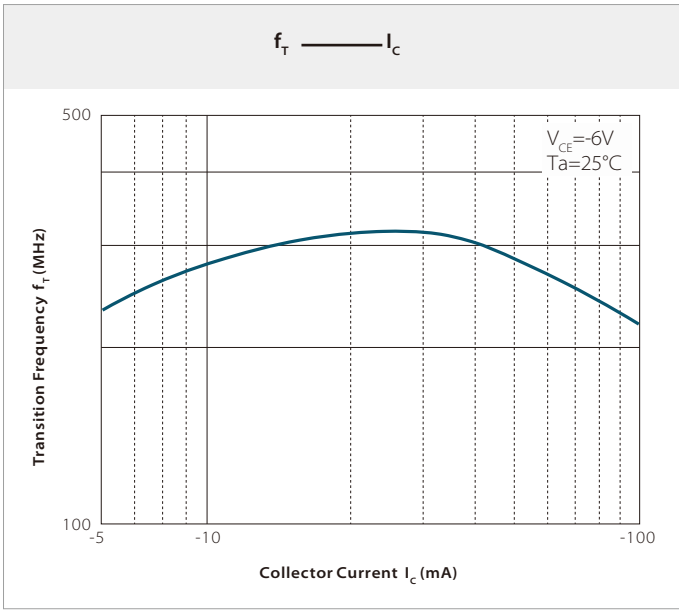


**$V_{CE sat}$  —  $I_C$**



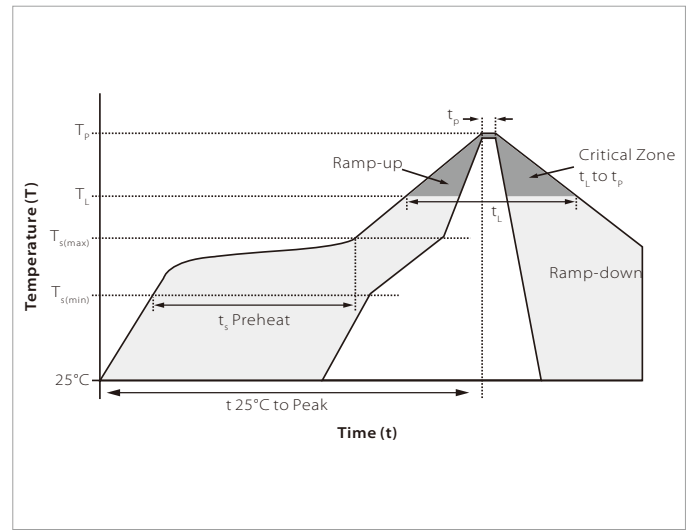
**$V_{BE sat}$  —  $I_C$**



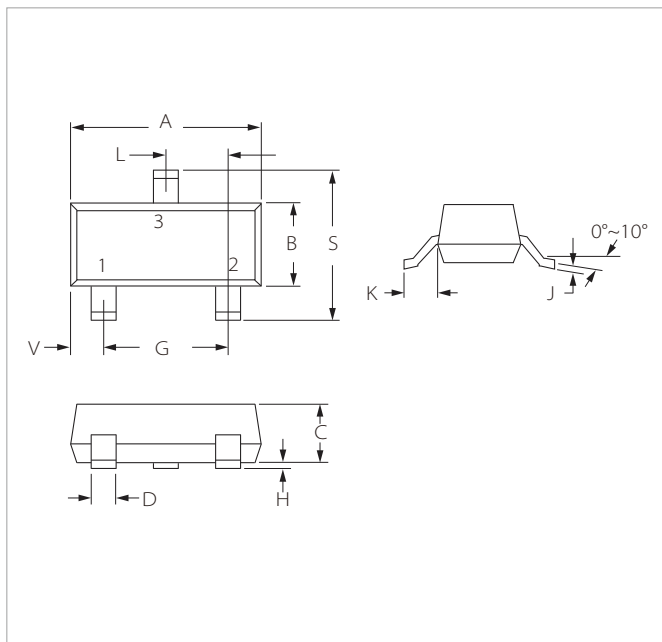


## SOLDERING PARAMETERS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ( $T_{s(min)}$ )	150°C
	Temperature Max ( $T_{s(max)}$ )	200°C
	Time (min to max) ( $t_s$ )	60 – 180 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		3°C/second max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max
Reflow	Temperature ( $T_L$ ) (Liquidus)	217°C
	Time (min to max) ( $t_L$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260°C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260°C

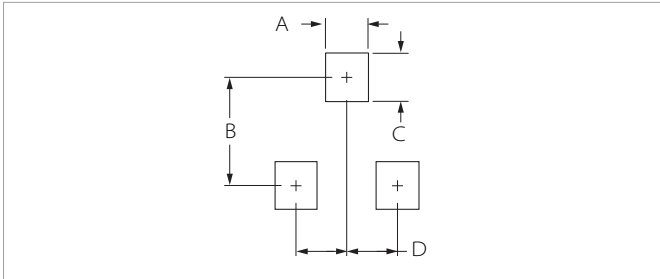


## SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.04	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.89	1.11	0.035	0.044
D	0.37	0.50	0.015	0.020
G	1.78	2.04	0.070	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.64	0.083	0.104
V	0.45	0.60	0.018	0.024

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
S9012	SOT-23	3000PCS	7"

To find your local partner within Semiwell's website : [www.semiwell.com.cn](http://www.semiwell.com.cn)

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