S9013W

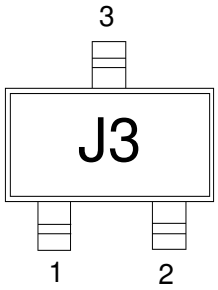
General Purpose Transistors NPN Silicon

Features

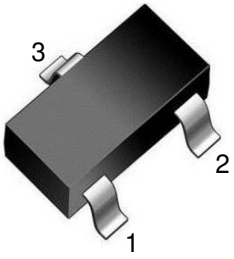
- High Collector Current
- Complementary To S9012
- Excellent h_{FE} Linearity

Application

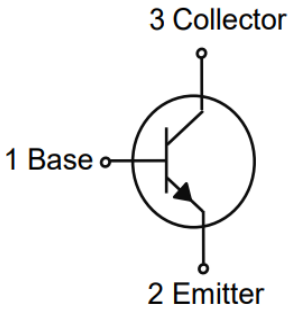
- High Collector Current



Marking and pin assignment



SOT-323 top view



Schematic diagram

Pb-Free

RoHS

Halogen-Free

Maximum Ratings(Ta=25℃ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	40	V
V_{CEO}	Collector-Emitter Voltage	25	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current	500	mA
P_C	Collector Power Dissipation	200	mW
$R_{\Theta JA}$	Thermal Resistance From Junction To Ambient	625	°C/W
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	°C

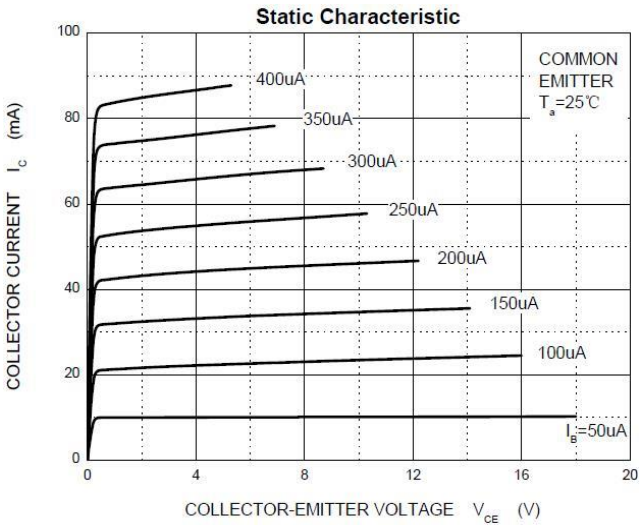
Electrical Characteristics (TJ=25℃ unless otherwise noted)

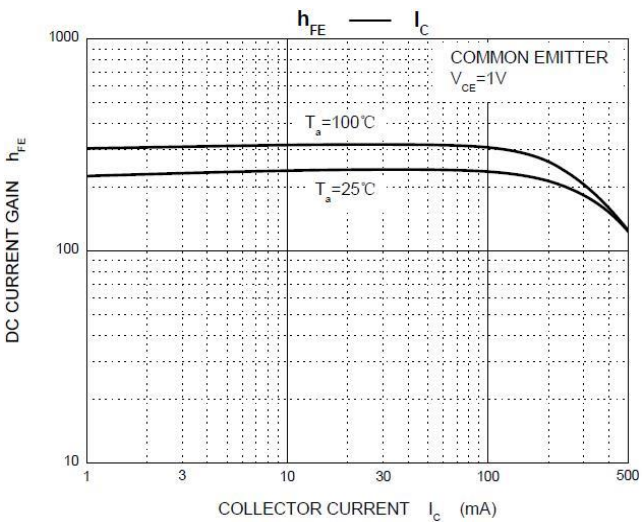
Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C=0.1mA, I_E=0	40	--	--	V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C=1mA, I_B=0	25	--	--	V
$V_{(BR)EBO}$	Emitter-base breakdown voltage	I_E=0.1mA, I_C=0	5	--	--	V
I_{CBO}	Collector cut-off current	V_{CB}=40 V , I_E=0	--	--	0.1	μA
I_{CEO}	Collector cut-off current	V_{CE}=20V , I_B=0	--	--	0.1	μA
I_{EBO}	Emitter cut-off current	V_{EB}=5V , I_C=0	--	--	0.1	μA
h_{FE}	DC current gain	V_{CE}=1V, I_C=50mA	120	--	400	
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=500mA, I_B=50mA	--	--	0.6	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_C=500mA, I_B=50mA	--	--	1.2	V
V_{BE}	Base-emitter voltage	V_{CE}=1V, I_C=10mA	--	--	0.7	V
C_{ob}	Collector output capacitance	V_{CB}=6V, I_E=0, f=1MHz	--	--	8	pF
f_T	Transition frequency	V_{CE}=6V, Ic=20mA, f=30MHz	150	--	--	MHz

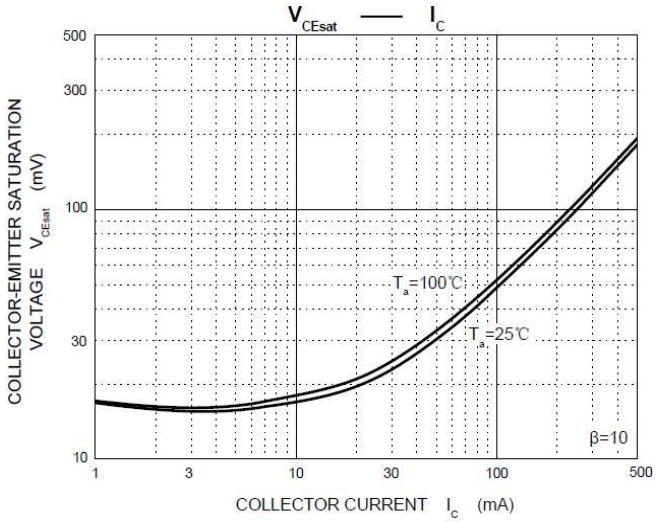
Classification of hFE

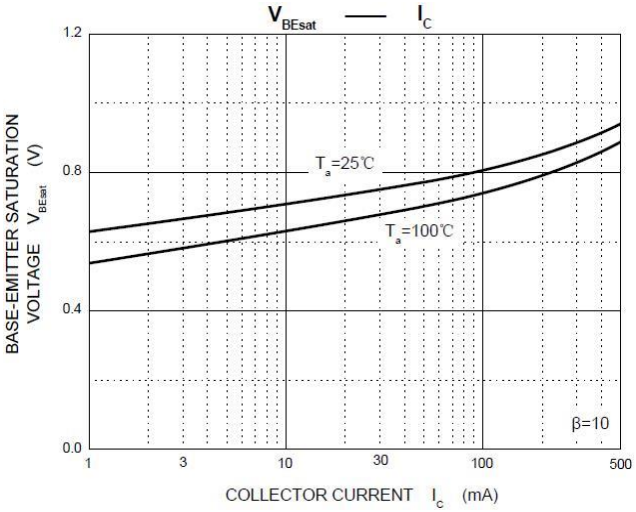
Rank	L	H	J
Range	120-200	200-350	300-400

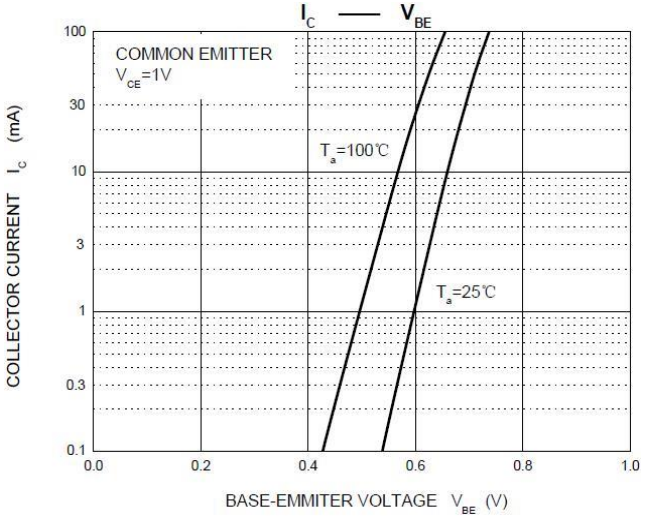
Typical Operating Characteristics

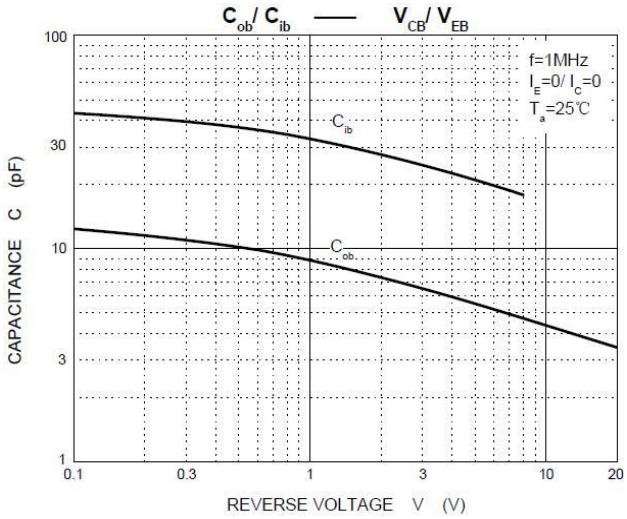


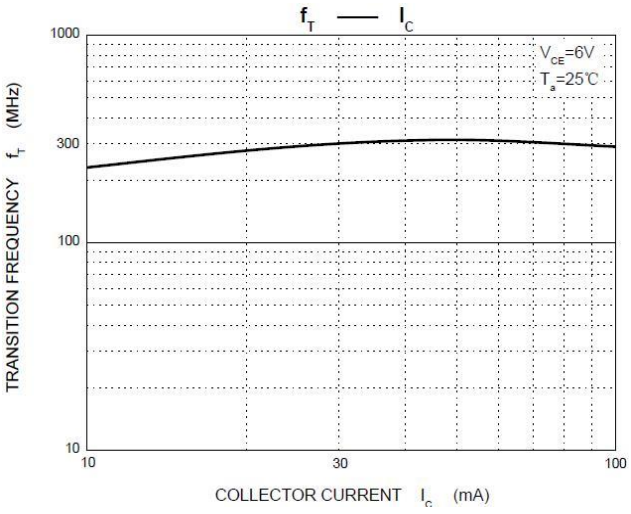


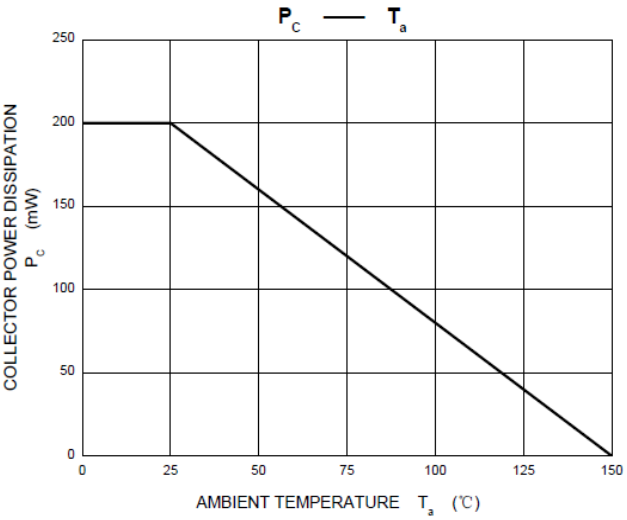

V_{CEsat} — I_C
COLLECTOR-EMITTER SATURATION VOLTAGE V_{CEsat} (mV)
500
300
100
30
10
1
3
10
30
100
500
T_a=100℃
T_a=25℃
β=10
COLLECTOR CURRENT I_C (mA)


V_{BEsat} — I_C
BASE-EMITTER SATURATION VOLTAGE V_{BEsat} (V)
1.2
0.8
0.4
0.0
1
3
10
30
100
500
T_a=25℃
T_a=100℃
β=10
COLLECTOR CURRENT I_C (mA)

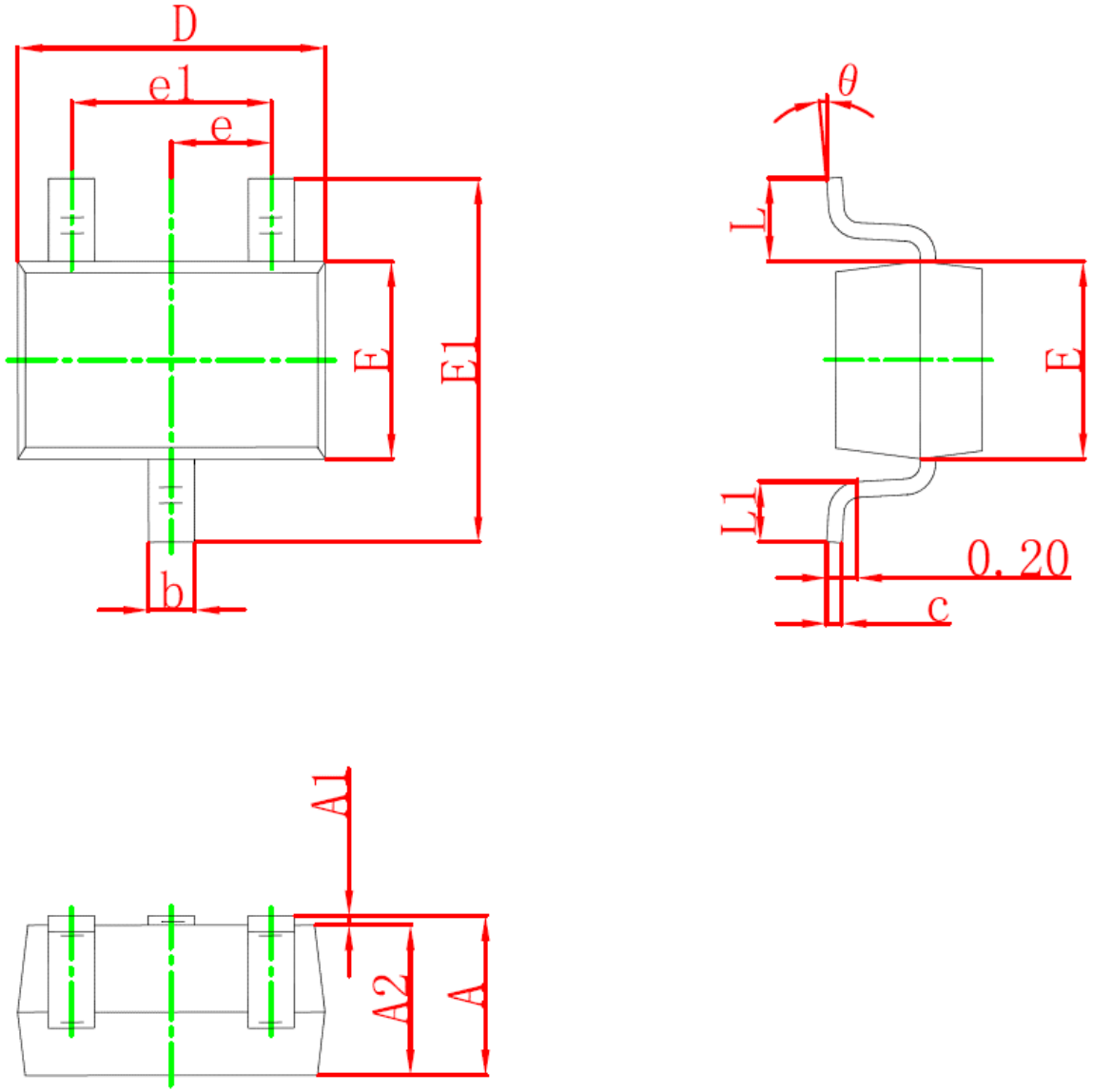

I_C — V_{BE}
COLLECTOR CURRENT I_C (mA)
100
30
10
3
1
0.3
0.1
COMMON EMITTER
V_{CE}=1V
T_a=100℃
T_a=25℃
0.0
0.2
0.4
0.6
0.8
1.0
BASE-EMMITER VOLTAGE V_{BE} (V)


C_{ob}/ C_{ib} — V_{CB}/ V_{EB}
CAPACITANCE C (pF)
100
30
10
3
1
0.1
0.3
1
3
10
20
f=1MHz
I_E=0/ I_C=0
T_a=25℃
C_{ib}
C_{ob}
REVERSE VOLTAGE V (V)


f_T — I_C
TRANSITION FREQUENCY f_T (MHz)
1000
300
100
10
10
30
100
V_{CE}=6V
T_a=25℃
COLLECTOR CURRENT I_C (mA)


P_C — T_a
COLLECTOR POWER DISSIPATION P_C (mW)
250
200
150
100
50
0
0
25
50
75
100
125
150
AMBIENT TEMPERATURE T_a (℃)

SOT-323 Package information



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°