2SA1013 TRANSISTOR (PNP)

1.BASE

2.COLLECTOR

3.EMITTER

SOT-89

FEATURE

- **High voltage**
- **Large continuous collector current capability**

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

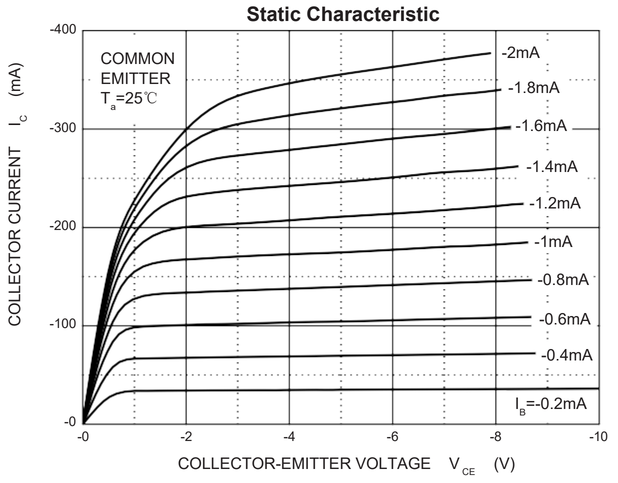
Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	-160	V
V_{CEO}	Collector-Emitter Voltage	-160	V
V_{EBO}	Emitter-Base Voltage	-6	V
I_C	Collector Current -Continuous	-1	A
P_C	Collector Power Dissipation	0.5	W
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55~+150	℃
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient	250	℃/W

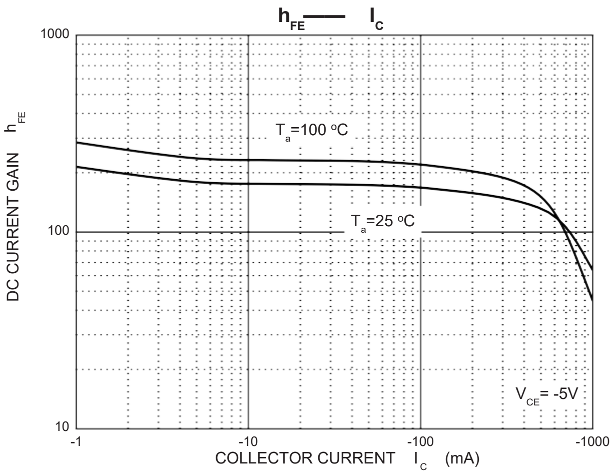
ELECTRICAL CHARACTERISTICS (T_a=25℃ unless otherwise specified)

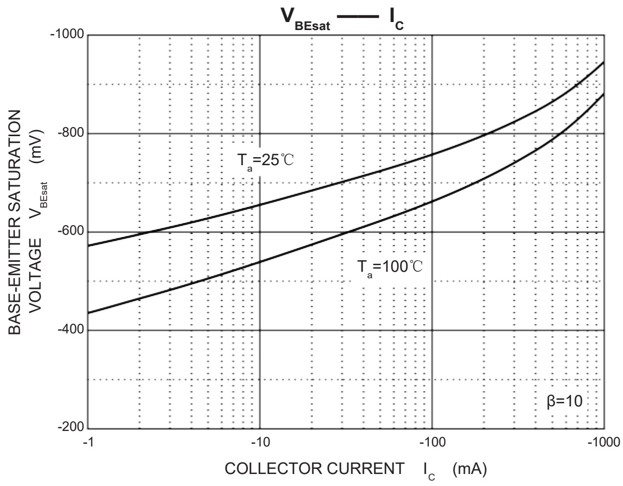
Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=- 100μA , I_E=0	-160		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C= -1mA , I_B=0	-160		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E= -10μA, I_C=0	-6		V
Collector cut-off current	I_{CBO}	V_{CB}=-150 V , I_E=0		-1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=-6V, I_C=0		-1	μA
DC current gain	h_{FE}	V_{CE}=-5 V, I_C=- 200mA	60	320	
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C= -500m A, I_B= -50mA		-1.5	V
Base-emitter voltage	V_{BE}	I_C= -5 mA, V_{CE}=- 5V		-0.75	V
Transition frequency	f_T	V_{CE}= -5 V, I_C= -200mA	15		MHz

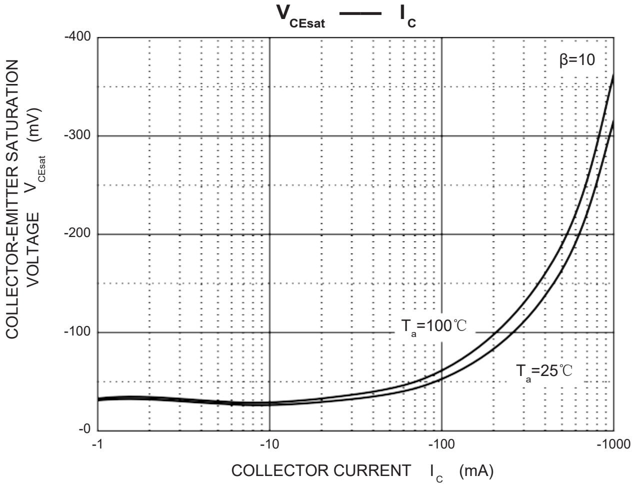
CLASSIFICATION OF h_{FE}

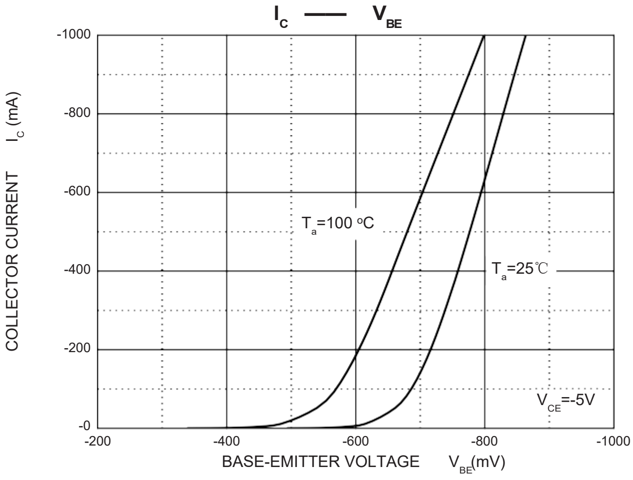
Rank	R	O	Y
Range	60-120	100-200	160-320

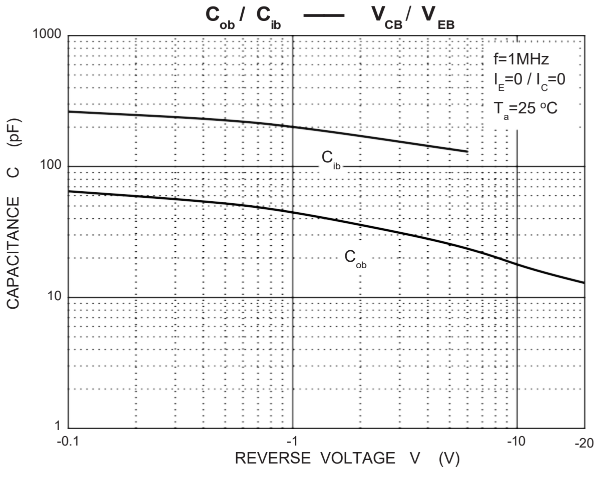

Static Characteristic
COMMON
EMITTER
T_a=25℃
COLLECTOR CURRENT I_C (mA)
-400
-300
-200
-100
-0
-0
-2
-4
-6
-8
-10
COLLECTOR-EMITTER VOLTAGE V_CE (V)
-2mA
-1.8mA
-1.6mA
-1.4mA
-1.2mA
-1mA
-0.8mA
-0.6mA
-0.4mA
I_B=-0.2mA

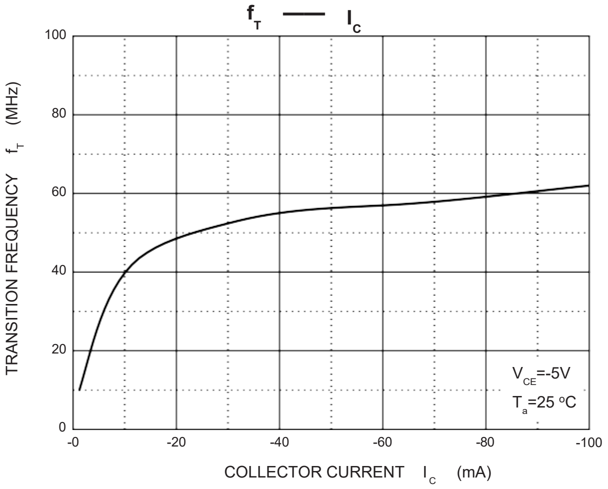

h_FE — I_C
DC CURRENT GAIN h_FE
1000
100
10
T_a=100 °C
T_a=25 °C
V_CE= -5V
-1
-10
-100
-1000
COLLECTOR CURRENT I_C (mA)

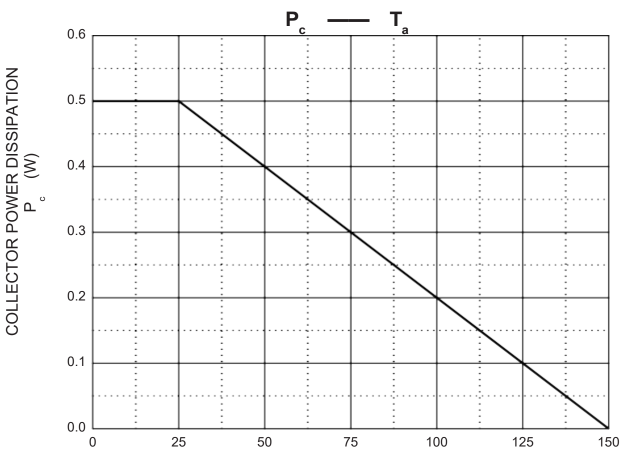

V_BEsat — I_C
BASE-EMITTER SATURATION VOLTAGE V_BEsat (mV)
-1000
-800
-600
-400
-200
T_a=25℃
T_a=100℃
β=10
-1
-10
-100
-1000
COLLECTOR CURRENT I_C (mA)


V_CEsat — I_C
COLLECTOR-EMITTER SATURATION VOLTAGE V_CEsat (mV)
-400
-300
-200
-100
-0
β=10
T_a=100℃
T_a=25℃
-1
-10
-100
-1000
COLLECTOR CURRENT I_C (mA)


I_C — V_BE
COLLECTOR CURRENT I_C (mA)
-1000
-800
-600
-400
-200
-0
T_a=100 °C
T_a=25℃
V_CE=-5V
-200
-400
-600
-800
-1000
BASE-EMITTER VOLTAGE V_BE(mV)


C_ob / C_ib — V_CB / V_EB
CAPACITANCE C (pF)
1000
100
10
1
f=1MHz
I_E=0 / I_C=0
T_a=25 °C
C_ib
C_ob
-0.1
-1
-10
-20
REVERSE VOLTAGE V (V)


f_T — I_C
TRANSITION FREQUENCY f_T (MHz)
100
80
60
40
20
0
V_CE=-5V
T_a=25 °C
-0
-20
-40
-60
-80
-100
COLLECTOR CURRENT I_C (mA)


P_c — T_a
COLLECTOR POWER DISSIPATION P_c (W)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
25
50
75
100
125
150