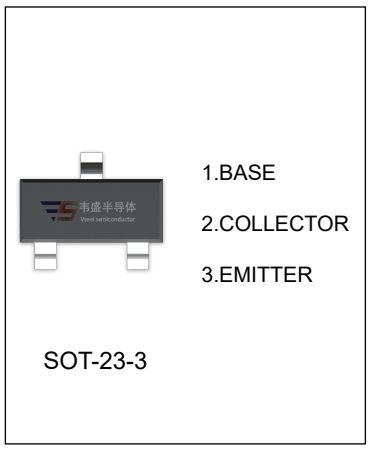
S9013 TRANSISTOR (NPN)



FEATURES

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

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

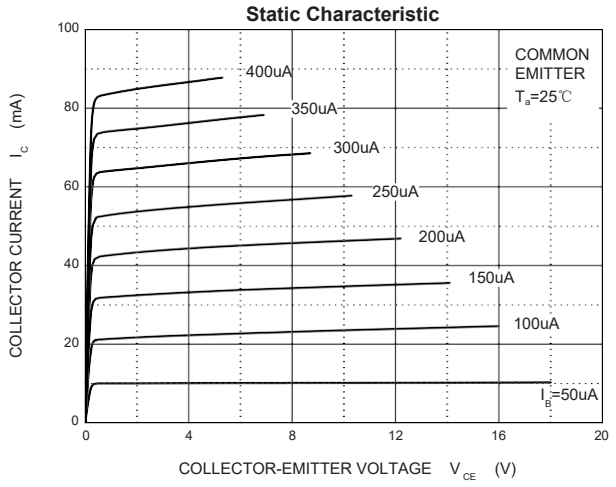
Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage	40	V
V_{CEO}	Collector-Emitter Voltage	25	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current	500	mA
P_C	Collector Power Dissipation	300	mW
$R_{\Theta JA}$	Thermal Resistance From Junction To Ambient	416	℃/W
T_J,T_{stg}	Operation Junction and Storage Temperature Range	-55～+150	℃

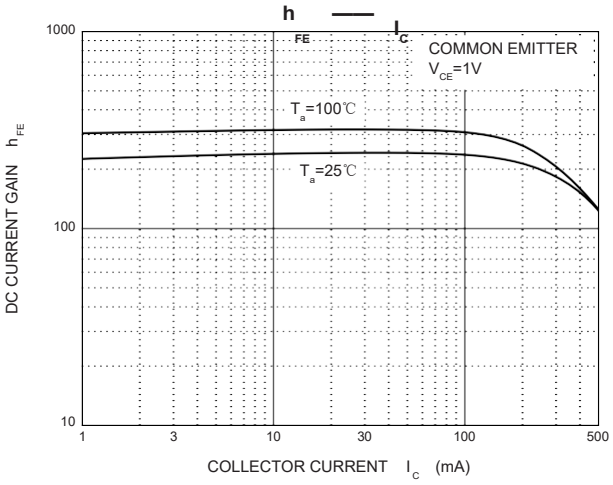
ELECTRICAL CHARACTERISTICS (T_a=25℃ unless otherwise specified)

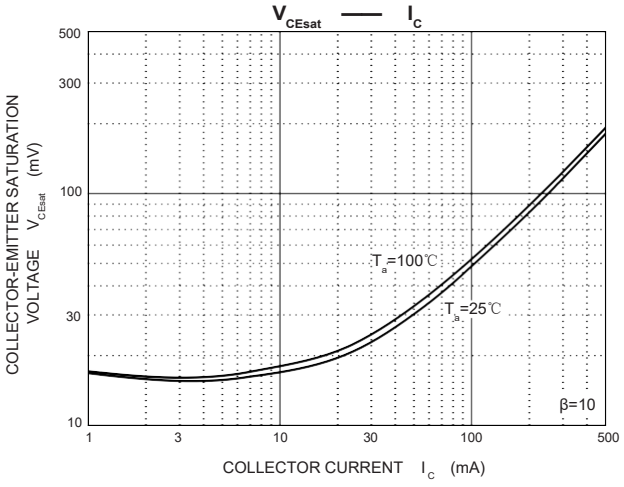
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=0.1mA, I_E=0	40			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C=1mA, I_B=0	25			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=0.1mA, I_C=0	5			V
Collector cut-off current	I_{CBO}	V_{CB}=40V, I_E=0			0.1	uA
Collector cut-off current	I_{CEO}	V_{CE}=20V, I_B=0			0.1	uA
Emitter cut-off current	I_{EBO}	V_{EB}=5V, I_C=0			0.1	uA
DC current gain	$h_{FE(1)}$	V_{CE}=1V, I_C=50mA	120		400	
	$h_{FE(2)}$	V_{CE}=1V, I_C=500mA	40			
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=500mA, I_B=50mA			0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	I_C=500mA, I_B=50mA			1.2	V
Base-emitter voltage	V_{BE}	V_{CB}=1V,I_C=10mA,			0.7	V
Transition frequency	f_T	V_{CE}=6V,I_C=20mA, f=30MHz	150			MHz
Collector output capacitance	C_{ob}	V_{CB}=6V, I_E=0, f=1MHz			8	pF

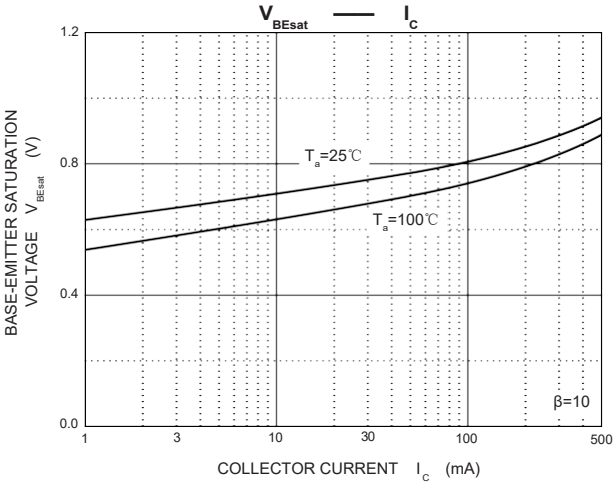
CLASSIFICATION OF $h_{FE(1)}$

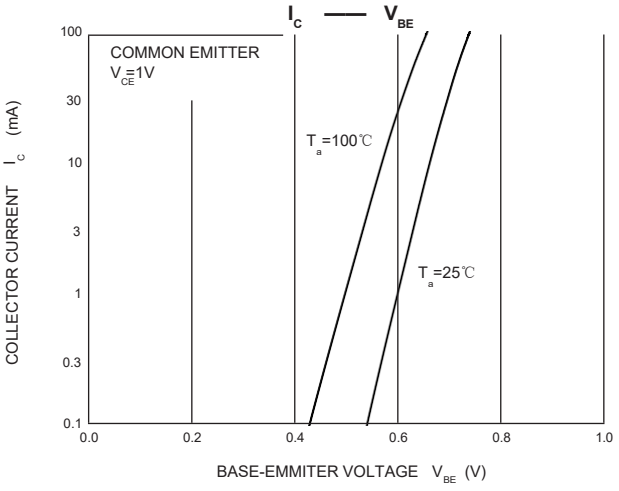
RANK	L	H	J
RANGE	120-200	200-350	300-400

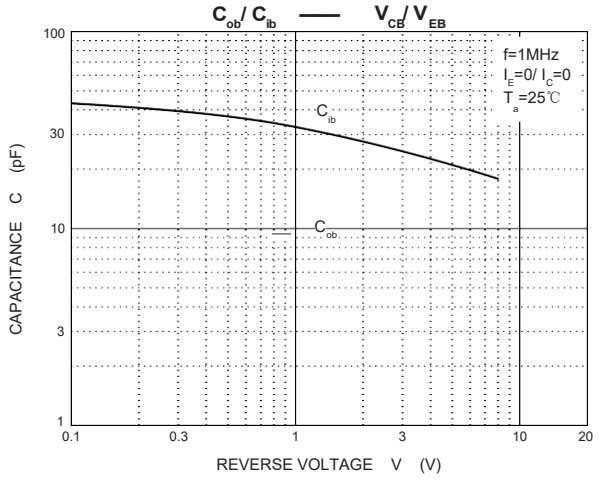

Static Characteristic
COMMON EMITTER
T_a=25℃
400uA
350uA
300uA
250uA
200uA
150uA
100uA
I_B=50uA
COLLECTOR CURRENT I_C (mA)
COLLECTOR-EMITTER VOLTAGE V_{CE} (V)

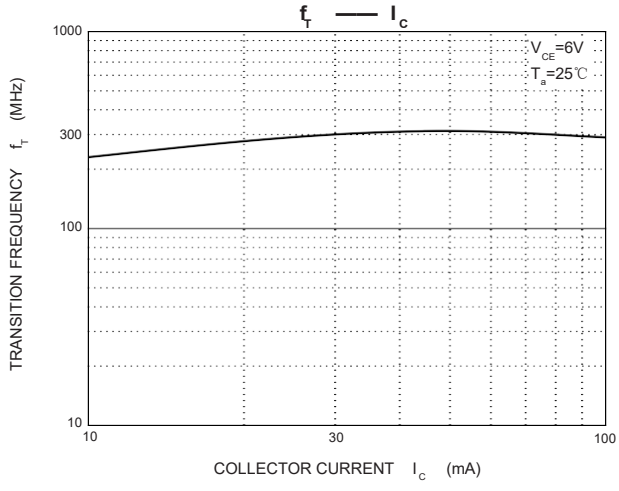

h_{FE} — I_C
COMMON EMITTER
V_{CE}=1V
T_a=100℃
T_a=25℃
DC CURRENT GAIN h_{FE}
COLLECTOR CURRENT I_C (mA)

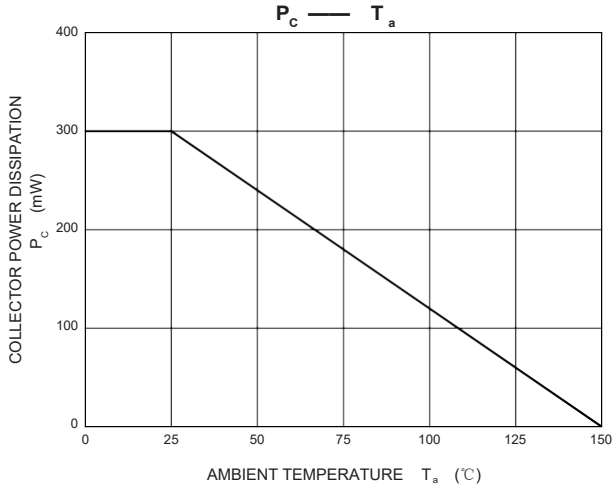

V_{CEsat} — I_C
T_a=100℃
T_a=25℃
β=10
COLLECTOR-EMITTER SATURATION VOLTAGE V_{CEsat} (mV)
COLLECTOR CURRENT I_C (mA)


V_{BEsat} — I_C
T_a=25℃
T_a=100℃
β=10
BASE-EMITTER SATURATION VOLTAGE V_{BEsat} (V)
COLLECTOR CURRENT I_C (mA)


I_C — V_{BE}
COMMON EMITTER
V_{CE}=1V
T_a=100℃
T_a=25℃
COLLECTOR CURRENT I_C (mA)
BASE-EMMITER VOLTAGE V_{BE} (V)


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


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


P_C — T_a
COLLECTOR POWER DISSIPATION P_C (mW)
AMBIENT TEMPERATURE T_a (℃)