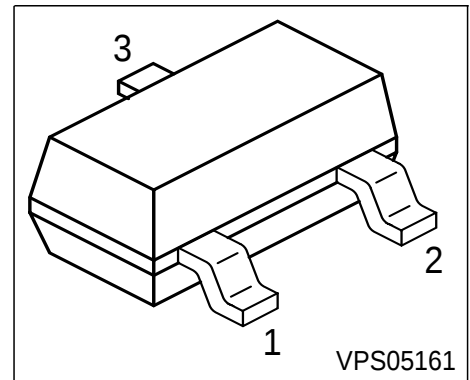
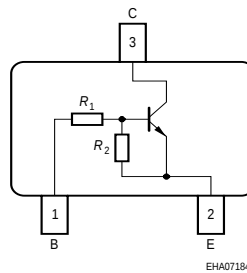


NPN Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1=10k\Omega$, $R_2=10k\Omega$)



Type	Marking	Pin Configuration			Package
BCR133	WCs	1 = B	2 = E	3 = C	SOT23

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	50	V
Collector-base voltage	V_{CBO}	50	
Emitter-base voltage	V_{EBO}	10	
Input on Voltage	$V_{i(on)}$	20	
DC collector current	I_C	100	mA
Total power dissipation, $T_S = 102\text{ °C}$	P_{tot}	200	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point ¹⁾	R_{thJS}	≤ 240	K/W
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¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

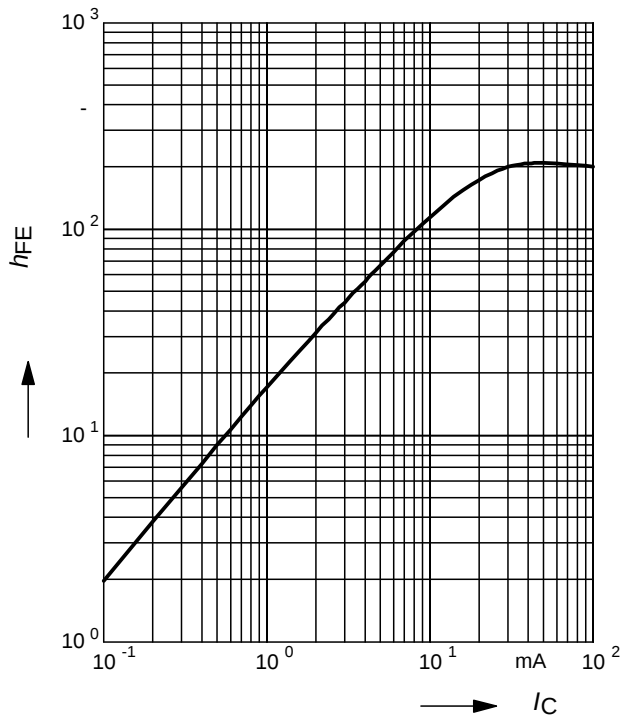
Electrical Characteristics at $T_A=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 100\text{ }\mu\text{A}$, $I_B = 0$	$V_{(\text{BR})\text{CEO}}$	50	-	-	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $I_B = 0$	$V_{(\text{BR})\text{CBO}}$	50	-	-	
Collector cutoff current $V_{\text{CB}} = 40\text{ V}$, $I_E = 0$	I_{CBO}	-	-	100	nA
Emitter cutoff current $V_{\text{EB}} = 10\text{ V}$, $I_C = 0$	I_{EBO}	-	-	750	μA
DC current gain 1) $I_C = 5\text{ mA}$, $V_{\text{CE}} = 5\text{ V}$	h_{FE}	30	-	-	-
Collector-emitter saturation voltage1) $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$	V_{CEsat}	-	-	0.3	V
Input off voltage $I_C = 100\text{ }\mu\text{A}$, $V_{\text{CE}} = 5\text{ V}$	$V_{\text{i(off)}}$	0.8	-	1.5	V
Input on Voltage $I_C = 2\text{ mA}$, $V_{\text{CE}} = 0.3\text{ V}$	$V_{\text{i(on)}}$	1	-	2.5	V
Input resistor	R_1	7	10	13	k Ω
Resistor ratio	R_1/R_2	0.9	1	1.1	-
AC Characteristics					
Transition frequency $I_C = 10\text{ mA}$, $V_{\text{CE}} = 5\text{ V}$, $f = 100\text{ MHz}$	f_{T}	-	130	-	MHz
Collector-base capacitance $V_{\text{CB}} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{cb}	-	3	-	pF

1) Pulse test: $t < 300\mu\text{s}$; $D < 2\%$

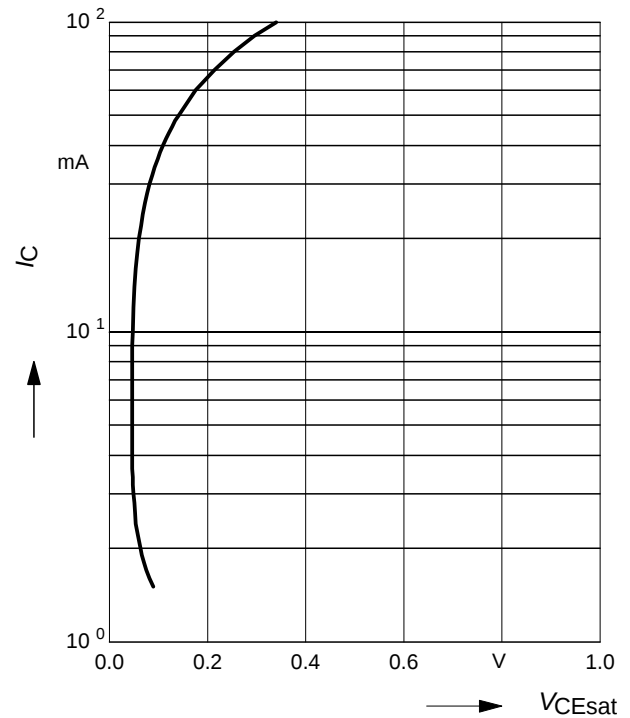
DC Current Gain $h_{FE} = f(I_C)$

$V_{CE} = 5V$ (common emitter configuration)



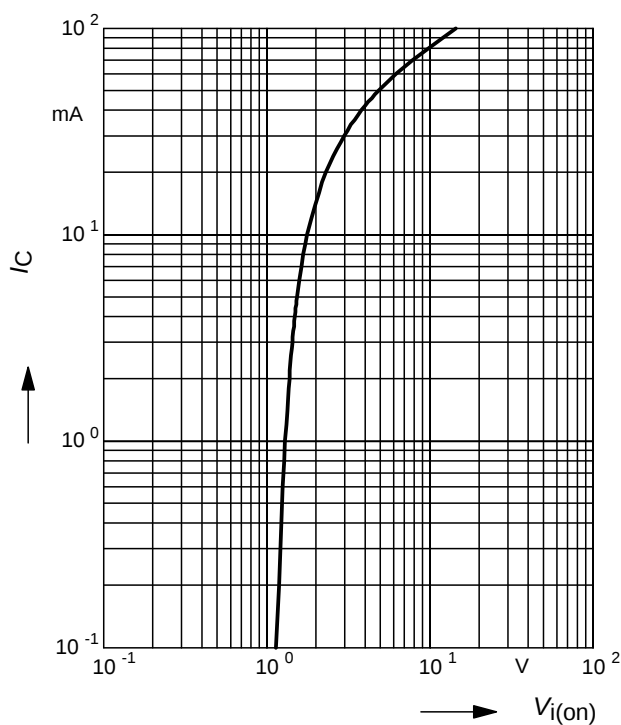
Collector-Emitter Saturation Voltage

$V_{CEsat} = f(I_C), h_{FE} = 20$



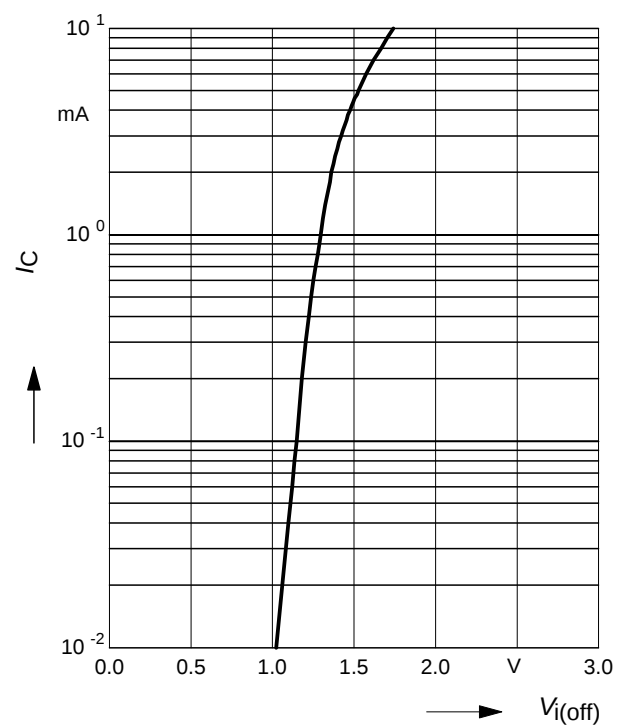
Input on Voltage $V_{i(on)} = f(I_C)$

$V_{CE} = 0.3V$ (common emitter configuration)

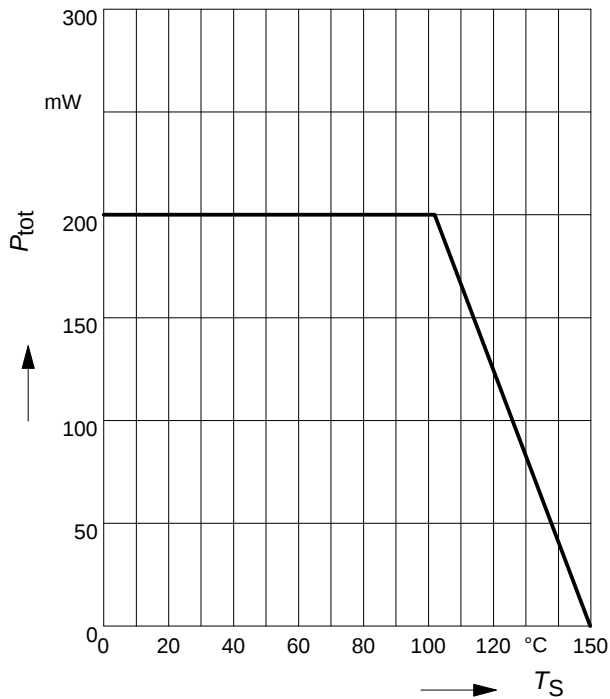


Input off voltage $V_{i(off)} = f(I_C)$

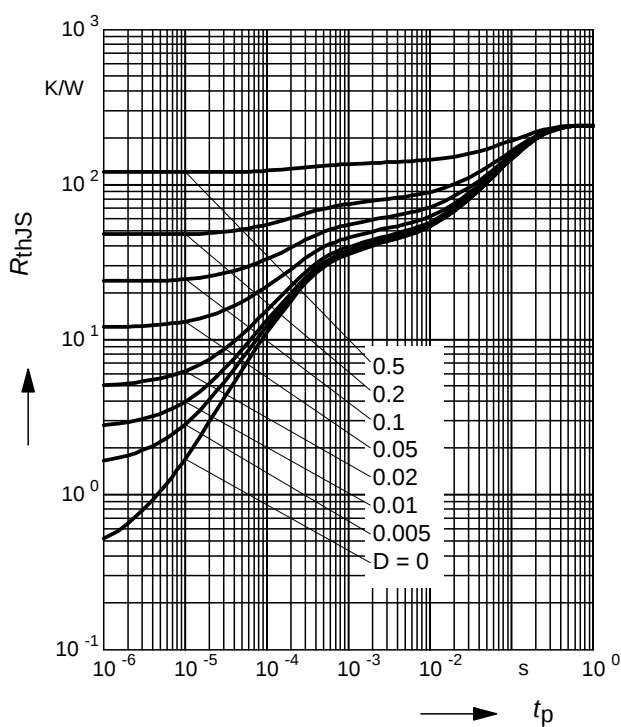
$V_{CE} = 5V$ (common emitter configuration)



Total power dissipation $P_{\text{tot}} = f(T_S)$



Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



Permissible Pulse Load

$P_{\text{totmax}} / P_{\text{totDC}} = f(t_p)$

