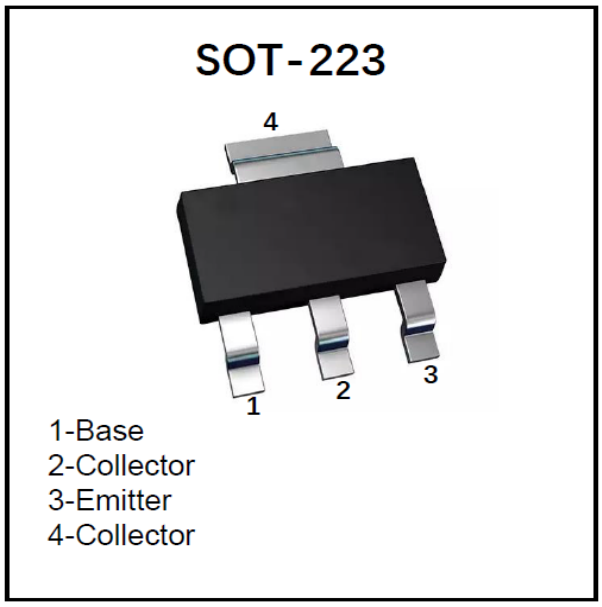
NPN Transistor



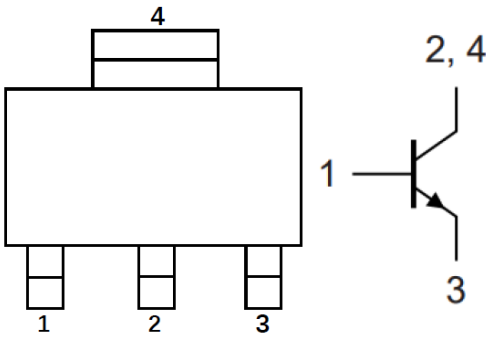
Features

- Epoxy meets UL-94 V-0 flammability rating
- Halogen free available upon request by adding suffix ”HF”
- Moisture Sensitivity Level 1

Mechanical Data

- **Package**: SOT-223
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking**: 304NZB

■Equivalent circuit



■Maximum Ratings (Ta=25℃ unless otherwise noted)

Item	Symbol	Unit	Conditions	Value
Collector-Emitter Voltage	V_{CEO}	V		60
Collector-Base Voltage	V_{CBO}	V		60
Emitter-Base Voltage	V_{EBO}	V		5
Collector Current	I_C	A		5.2
Peak Collector Current	I_{CM}	A	single pulse,t_P=1ms	10.4
Peak Base Current	I_{BM}	A	t_P=1ms	0.5
Power Dissipation(Note1)	P_D	W		1
Operation Junction Temperature	T_j	℃		-55 to +150
Storage Temperature	T_{stg}	℃		-55 to +150

■Electrical Characteristics (Ta=25℃ unless otherwise noted)

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-Base Breakdown Voltage	V_{CBO}	V	I_C=100uA,I_E=0	60		
Collector-Emitter Breakdown Voltage	V_{CEO*}	V	I_C =10mA,I_B=0	60		
Emitter-Base Breakdown Voltage	V_{EBO}	V	I_E=100μA,I_C=0	5		
Collector-Base Cut-Off Current	I_{CBO}	nA	V_{CB}=60V, I_E =0			100
Emitter-Base Cut-Off Current	I_{EBO}	nA	V_{EB}=5V, I_C =0			100
DC Current Gain	h_{FE}		V_{CE}=2V,I_C=0.5A	300		
	h_{FE}		V_{CE}=2V,I_C=1A	300		
	h_{FE}		V_{CE}=2V,I_C=2A	250		
	h_{FE}		V_{CE}=2V,I_C=4A	150		
	h_{FE}		V_{CE}=2V,I_C=6A	80		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	mV	I_C=0.5A,I_B=50mA			35
			I_C=1A,I_B=50mA			70
			I_C=1A,I_B=10mA			120
			I_C=2A,I_B=40mA			150
			I_C=4A,I_B=200mA			220
			I_C=4A,I_B=400mA			210
			I_C=4A,I_B=80mA			305
			I_C=5.2A,I_B=260mA			280
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	V	I_C=1A,I_B=100mA			0.9
			I_C=4A,I_B=400mA			1.05
Collector-Emitter Saturation Resistance	$R_{CE(sat)}$	mΩ	I_C=4A,I_B=200mA			55
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	V	V_{CE}=2V I_C=2A			0.85
Output Capacitance	Cob	pF	V_{CB}=10V, I_E=0, f=1MHz		70	
Transition Frequency	f_T	MHz	V_{CE}=10V,I_C=100mA,f=100MHz		140	

■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient	$R_{\theta J-A}$(1)	℃/W	125
Thermal resistance, junction-to-case	$R_{\theta J-C}$(1)	℃/W	40

Note：

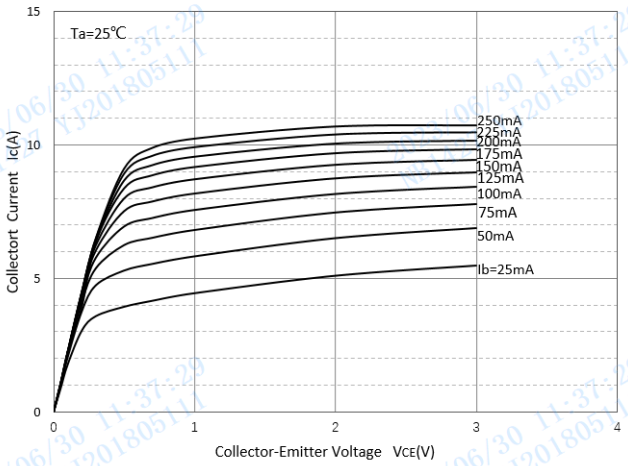
（1）Thermal resistance from junction to ambient and from junction to case mounted on FR4 P.C.B. with 1mm^2 copper pad areas

■Ordering Information (Example)

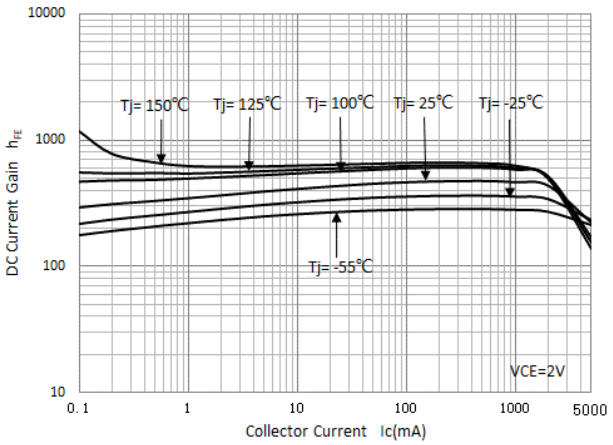
PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
PBSS304NZB	F2	Approximate 0.11	2500	5000	25000	13” reel

■Characteristics (Typical)

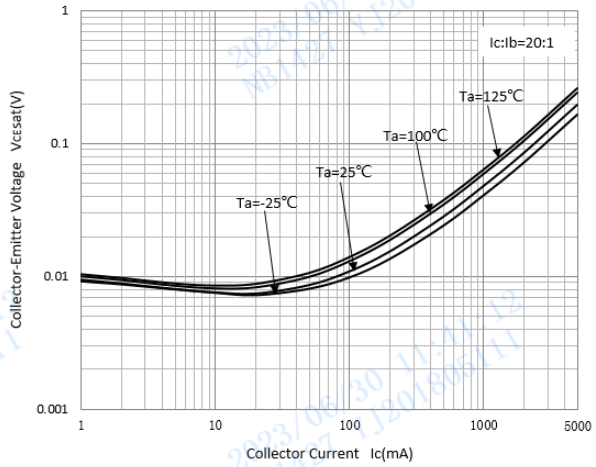
Static Characteristic



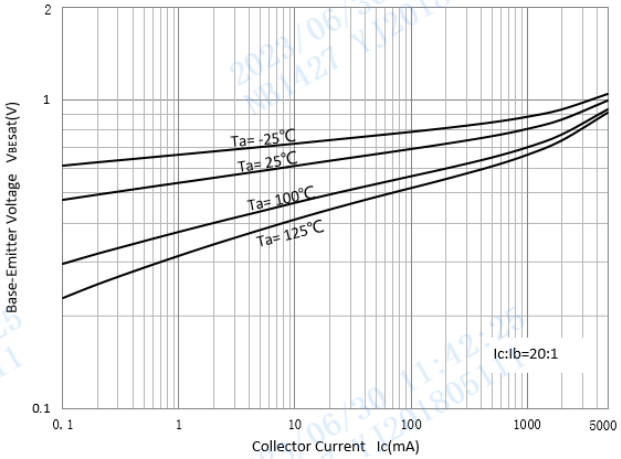
DC Current Gain



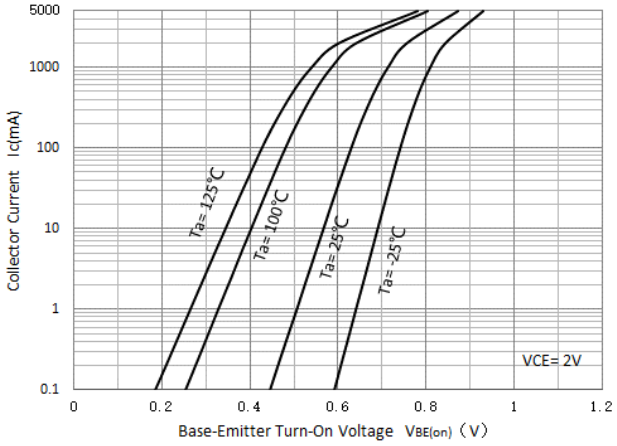
Collector-Emitter Saturation Voltage



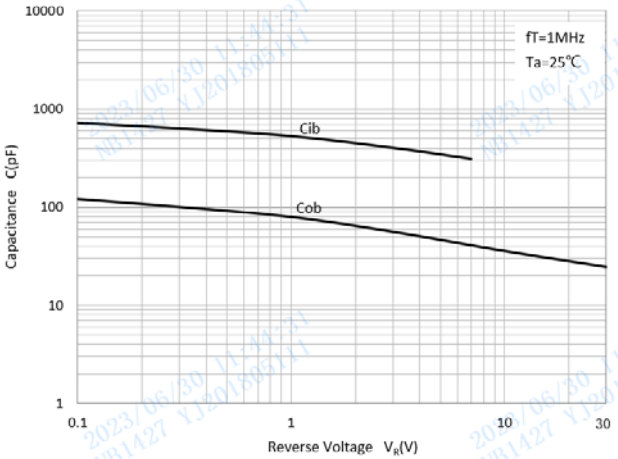
Base-Emitter Saturation Voltage

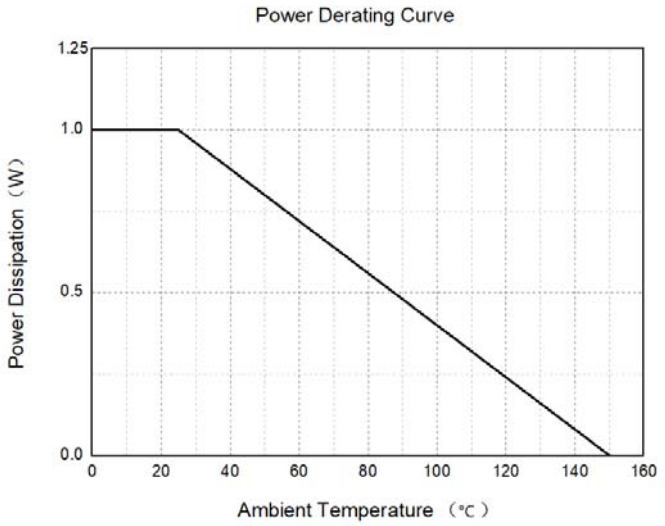


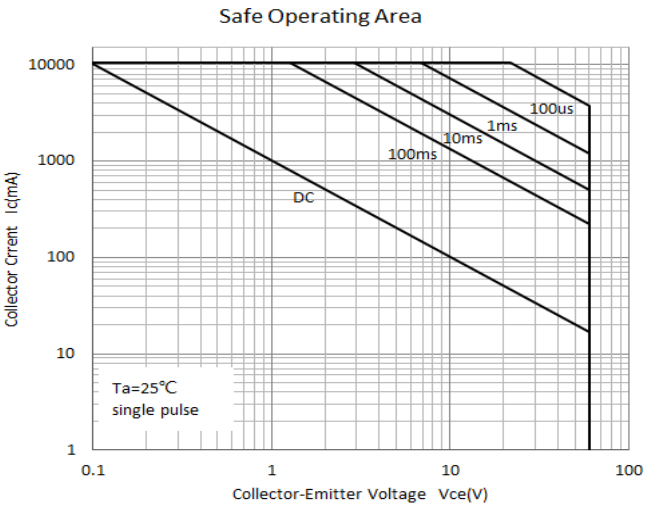
Base-Emitter Turn-On Voltage



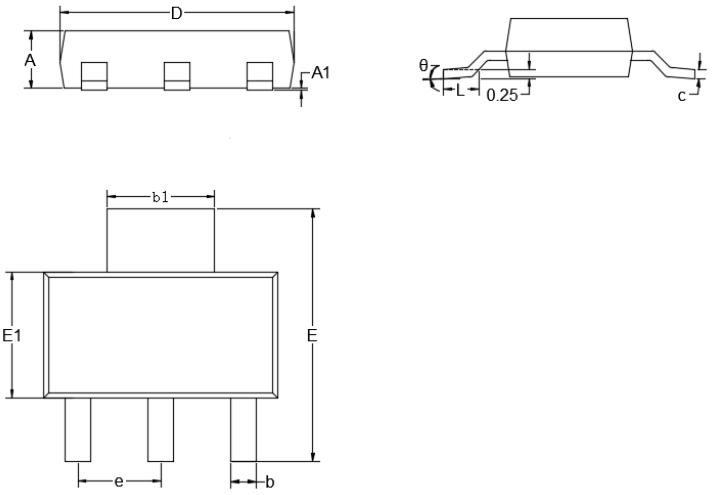
Cob/Cib-V_{CB}/V_{EB}





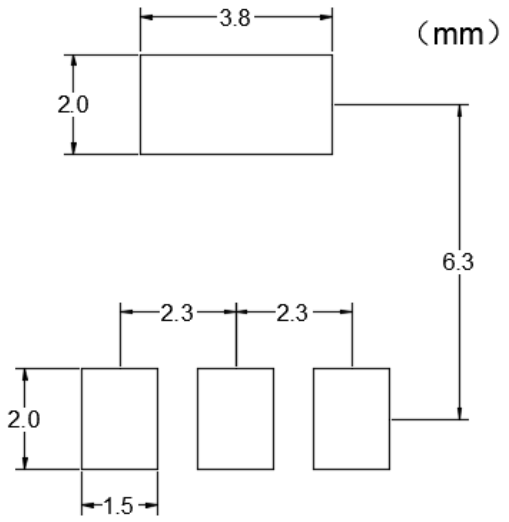


■SOT-223 Package Outline Dimensions



DIMENSIONS				
DIM	INCHES		MM	
	MIN	MAX	MN	MAX
A	0.0591	0.0670	1.5000	1.7000
A1	0.0008	0.0039	0.0200	0.1000
b	0.0259	0.0330	0.6600	0.8400
b1	0.1140	0.1220	2.9000	3.1000
c	0.0090	0.0138	0.2300	0.3500
D	0.2480	0.2640	6.3000	6.7000
E	0.2637	0.2874	6.7000	7.3000
E1	0.1290	0.1460	3.3000	3.7000
e	0.0866	0.0945	2.2000	2.4000
L	0.0295	0.0492	0.7500	1.2500
θ	0°	10°	0°	10°

■SOT-223 Suggested Pad Layout



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