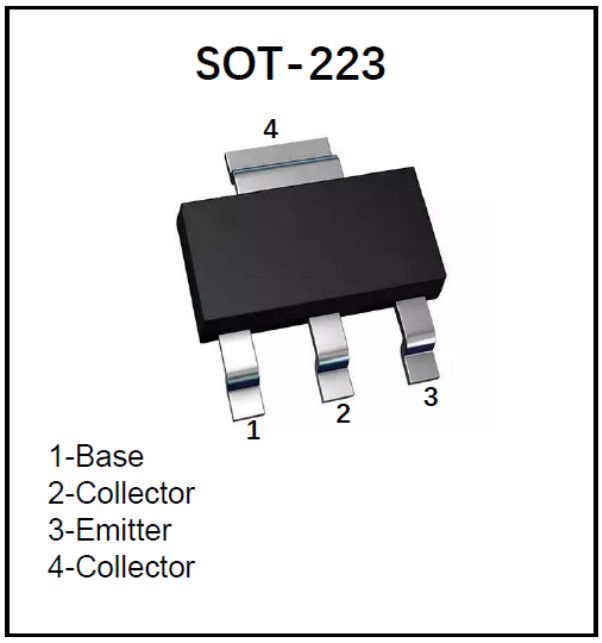
NPN Transistor



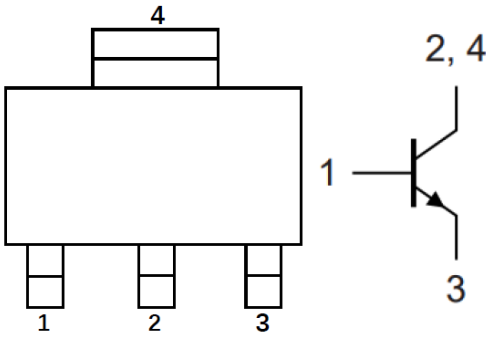
Features

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

Mechanical Data

- **Package**: SOT-223
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking**: S304NZ

■Equivalent circuit



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

Item	Symbol	Unit	Conditions	Value
Minimum Collector-Emitter Voltage	V_{CEO}	V		60
Minimum Collector-Base Voltage	V_{CBO}	V		60
Minimum Emitter-Base Voltage	V_{EBO}	V		5
Collector Current	I_C	A		5.2
Peak Collector Current	I_{CM}	A	t_P=1ms	10.4
Peak Base Current	I_{BM}	A	t_P=1ms	0.5
Power Dissipation	P_D (1)	W		1
Thermal Resistance From Junction To Ambient	$R_{\theta J\text{-}A}$ (1)	℃/W		125
Thermal Resistance, Junction-To-Case	$R_{\theta J\text{-}C}$ (1)	℃/W		40

Operation Junction Temperature	T_j	℃		-55 to +150
Storage Temperature	T_{stg}	℃		-55 to +150

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

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

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

Delay Time	td	ns	V_{CC}=12.5V, I_C=3A, I_{BON}=0.15A I_{Boff}=-0.15A		25	
Rise Time	tr	ns			45	
Turn-on Time	t_{ON}	ns			70	
Storage Time	ts	ns			450	
Fall Time	tf	ns			90	
Turn-off Time	t_{Off}	ns			540	

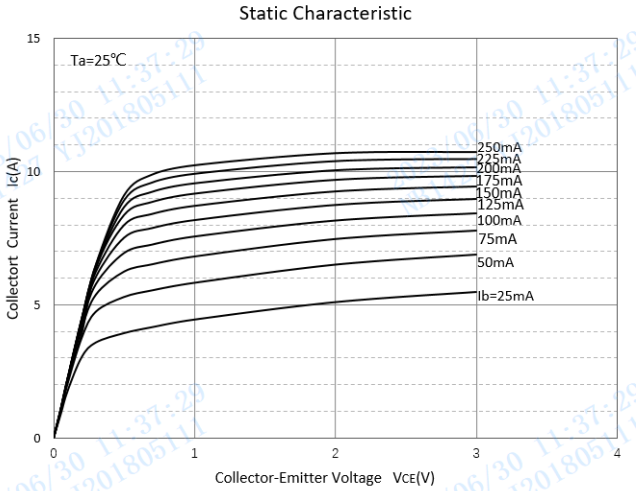
Note：

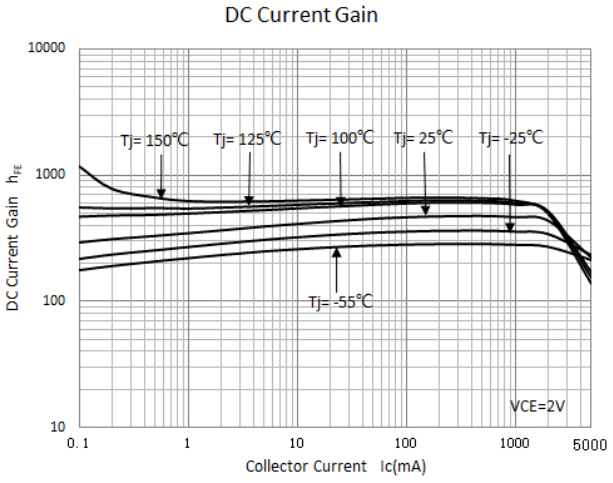
（2）Pulse test：tp ≤ 300 us ; δ ≤ 0.02

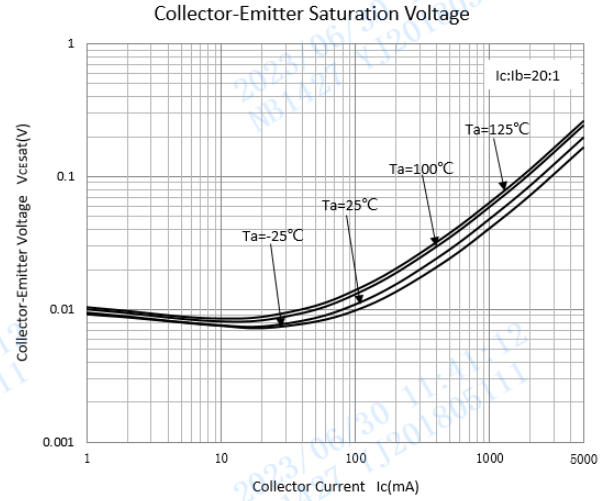
■Ordering Information (Example)

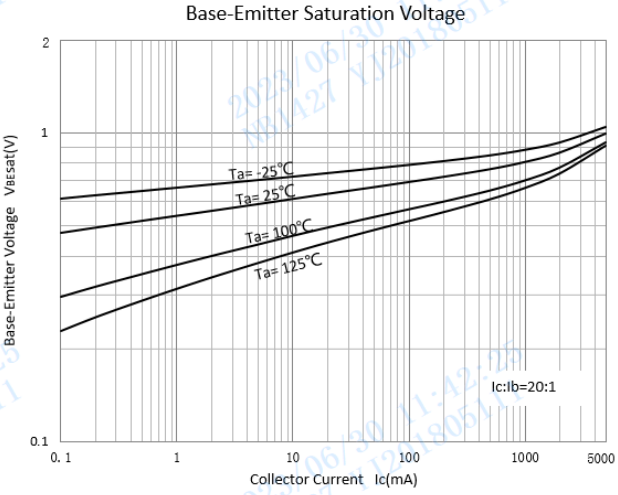
PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
PBSS304NZ	F2	Approximate 0.11	2500	5000	25000	13” reel

■Characteristics (Typical)

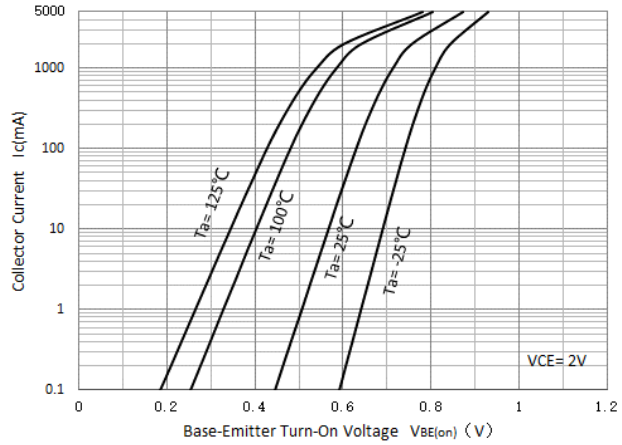




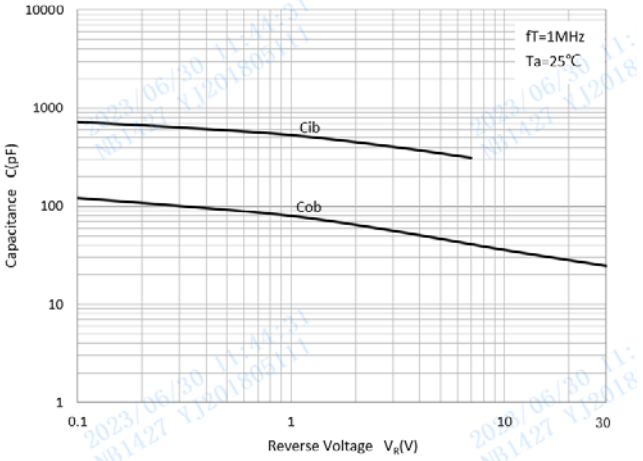




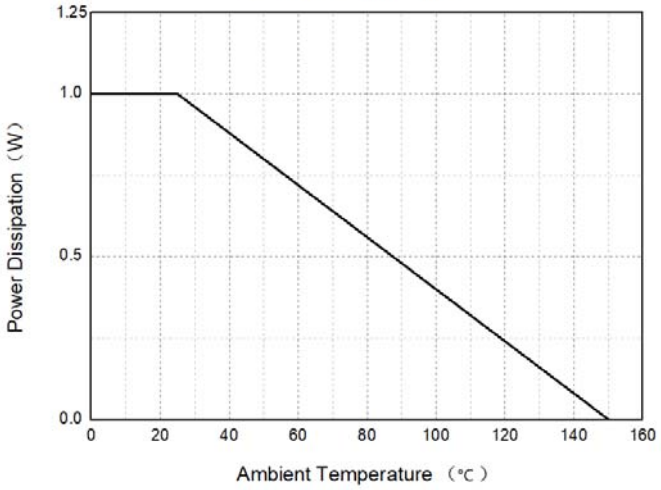
Base-Emitter Turn-On Voltage



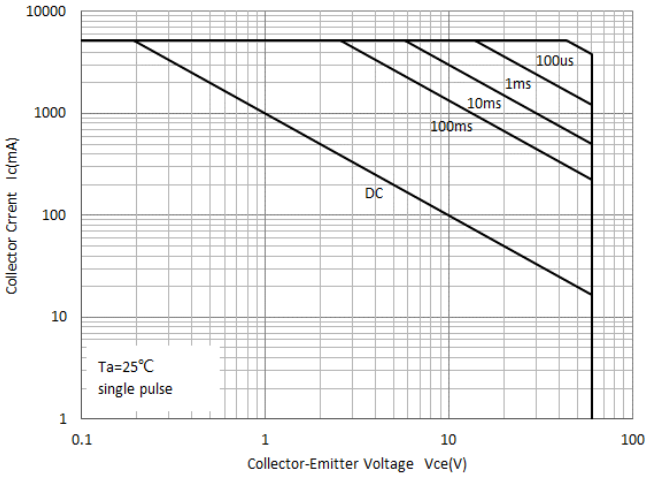
Cob/Cib-V_{CB}/V_{EB}



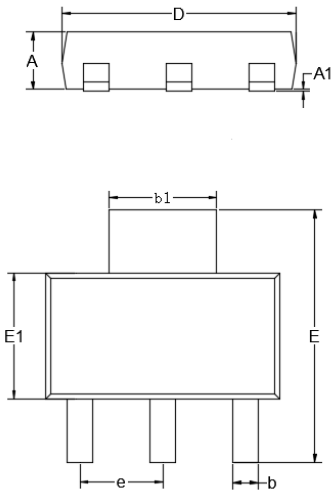
Power Derating Curve

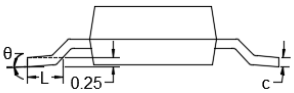


Safe Operating Area



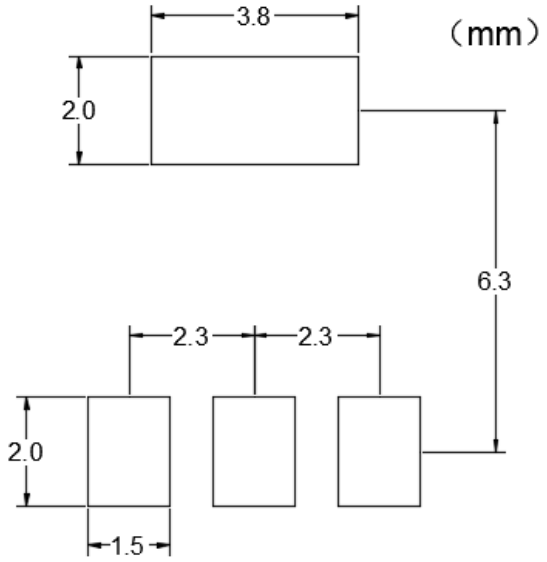
■SOT-223 Package Outline Dimensions





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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ISSUE	REVISION	DATE
1.0	New Datasheet for 华为	07-Jul-23
1.1	HFE特性曲线新增-55℃、150℃温度点，新增RJC规格为40℃/W	18-Oct-23